Analysis of Optimum Marketing Strategy with Game Theory (Case Study: Marketplace Indonesian)

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Abstract
The increasing number of pandemic cases in early 2021, has made online trading (marketplace) more widespread, making competition for marketplace companies getting tighter. Marketing strategy competition can be tested with a game theory approach. This study aims to determine the optimum marketing strategy in the marketplace so as to increase market share. From the data processing on the payoff matrix, there is no saddle point where the maximum value is not the same as the minimum value so that the pure strategy is not the optimum strategy. Furthermore, the data is processed using the POM-QM program to determine the value of the most optimum marketing strategy for each marketplace. Get games between marketplaces using a mixed strategy. In the Shopee and Tokopedia games, the optimal game value is 9%. In the second game, Shopee and Lazada, the optimal game value is 10%. In Shopee and Bukalapak games, the optimal game value is 8%. In the Shopee and BiliBili games, the optimal game value is 16%. In the Tokopedia and Lazada games, the optimal game value is 10%. In the Tokopedia and Bukalapak games, the optimal game value is 9%. In the Tokopedia and BiliBili games, the optimal game value is 9%. In the Lazada and Bukalapak games, the optimal game value is 11%. In the Lazada and BiliBili games, the optimal game value is 13%. In the last game, Bukalapak and BiliBili, the optimal game value was 14%.

Keywords: Game Theory, Marketing Strategy, Marketplace.

1. Introduction
The increasing number of pandemic cases in early 2021 has made online (marketplace) more widespread [1]. The results of a survey conducted by We Are Social in April 2021 revealed that Indonesia is the first country with the highest percentage of e-commerce in the world, followed by England, Italy, and then other countries. As many as 88.1% of internet users in Indonesia have used e-commerce to buy certain products in the last few months. This percentage is the highest in the world, where the average e-commerce is 78.6% [2].

The high number of E-commerce or marketplace in 2021 will make marketplace compete to attract marketplace by creating more varied features [3] [4]. Based on data in the Top Brand Index Phase 2 2021, it shows that the strength of the brand in the online buying and selling site category was won by Shopee with a percentage of 41.8%. Then followed by Tokopedia at 16.7%, Lazada 15.2%, Bukalapak 9.5% and BiliBili 8.1% in order to compete competitively and increase users, an optimal marketing strategy is
needed [5]. The optimal marketing strategy is a weapon used by the company to win the competition in the market. One way that can be used to analyze the right marketing strategy is to apply game theory.

The application of game theory based on the marketing mix, namely product, price, promotion, distribution, people, process, and physical evidence, is one way that can facilitate in-depth analysis of market [6] conditions in the hope of increasing sales by further increasing the superior variables between products, price, promotion, distribution, seller, process and physical form in the marketplace [7] [8].

Based on the fairly tight competition for the marketplace, the right strategy is needed using the game theory method. This method compares each marketplace so that it can find out the advantages and disadvantages of each marketplace. By using this method, it is expected to determine the optimal marketing strategy in the marketplace in order to compete in the market [9] [10]. The purpose of this research is to determine the optimum marketing strategy in the marketplace so as to increase market share.

Literature review that has been done author used in the chapter “Introduction” to explain the difference of the manuscript with other papers, that it is innovative, it is used in the chapter “Research Method” to describe the step of research and used in the chapter “Findings” to support the analysis of the results [11] [12]. If the manuscript was written really have high originality, which proposed a new method or algorithm, it can be added on the “Research Method” to explain briefly the proposed method or algorithm [13].

2. Research Method

To solve the problem in this study, the researcher used the Game Theory method. There are stages to overcome the problems in this research, namely:
The description related to problem solving is that field studies and literature studies are precursors to obtaining problem formulation and research objectives. Then the researcher identified the research variables [14]. Collecting data using a questionnaire that begins with making a questionnaire, then distributing the questionnaire and then collecting it to see the results. After the questionnaires are collected, the data will first be tested for adequacy, validity and reliability of the data. If all the test data are met,
then the calculation is continued with Game Theory which begins with a comparison based on competitive advantage, then makes a pay off to determine the value of the game so that saddle points occur. Saddle points then processing is carried out with mixed methods assisted by software POM-QM [15] [16]. Then the optimal marketing strategy is generated for each marketplace. Then a discussion of the results that have been obtained is carried out so that conclusions and suggestions can be drawn.

2.1 Results and Discussion

2.1 Questionnaire Dissemination Questionnaires

Were distributed online with the help of google forms. Questionnaires were distributed through social media with the criteria that the respondents had known the five marketplaces that were used as research objects [17]. The return of the questionnaire that has been filled out by the respondent can be accessed through Microsoft Excel contained in the google form. In this study, 135 questionnaires have been filled out by respondents. A total of 125 questionnaires were declared appropriate, and as many as 10 questionnaires were not appropriate so they could not be continued, because the respondents answered that they had never used the five marketplaces which were the objects of this study. So that the data to be processed are 125 questionnaires.

2.2 Data Sufficiency Test

From the results of the questionnaires filled out by 135 respondents, 125 questionnaires were filled out correctly. The researcher uses Bernoulli in the following equation:

\[
N \frac{(1.96)^2 \cdot \left( \frac{125}{135} \right) \cdot \left( \frac{10}{135} \right)}{(0.05)^2} = 105.39 105
\]

From the above calculation, it can be seen that the minimum sample is 105 respondents, meaning that the sample is said to be sufficient if there are 105 respondents or more.

2.3 Validity and Reliability Test

From the data as many as 125 pieces of questionnaires, it is obtained df = 125-2 = 123. From the error rate of 0.05%, it is obtained from a table of 0.1757. It can be seen in the following table:

| No | Attribute Strategy | r count | r table | Description |
|----|--------------------|---------|---------|-------------|
| 1  | Completeness       | 0.621   | 0.1757  | Valid       |
| 2  | Brand Image        | 0.643   | 0.1757  | Valid       |
| 3  | Affordability      | 0.701   | 0.1757  | Valid       |
| 4  | Discount           | 0.591   | 0, 1757 | Valid       |
| 5  | Media              | 0.706   | 0.1757  | Valid       |
From the eleven strategy attributes that have been tested, it can be seen that all the strategy attributes in the marketplace are declared valid. Reliability testing was carried out using software SPSS 20.0. Test results marketplace are as follows:

| No | Attribute | r count | r table | Description |
|----|-----------|---------|---------|-------------|
| 6  | Event     | 0.611   | 0.1757  | Valid       |
| 7  | Expedition| 0.608   | 0.1757  | Valid       |
| 8  | Convenience| 0.597   | 0.1757  | Valid       |
| 9  | Features  | 0.714   | 0.1757  | Valid       |
| 10 | Payment   | 0.1757  | 0.576   | Valid       |
| 11 | Authenticity| 0.644   | 0.1757  | Valid       |

In table II the value of $r_{alpha}$ > 0.1757 i.e. 0.854 > 0.1757, so the results of the questionnaire are declared reliable.
The eleven strategic attributes have been tested, it can be seen that all the strategy attributes on the marketplace Tokopedia Reliability testing was carried out using software SPSS 20.0 test marketplace Tokopedia.

Table 4. Reliability Test Results Marketplace Tokopedia

| No | Description | r alpha | r table | Valid |
|----|-------------|---------|---------|-------|
| 10 | Payment     | 0.680   | 0.1757  |       |
| 11 | Authenticity| 0.672   | 0.1757  | Valid |

In table IV the $r_{alpha} > 0.1757$ i.e. $0.897 > 0.1757$, so the results of the questionnaire are declared reliable.

Table 5. Validity Test Results Of Lazada Marketplace

| No | Attribute Strategy | r count | r table | Description |
|----|---------------------|---------|---------|-------------|
| 1  | Completeness        | Valid   | 0.593   | 0.1757     | 2           |
| 2  | Brand               | Image   | 0.617   | 0.1757     | Valid       |
| 3  | Affordability       | Valid   | 0.543   | 0.1757     | 4           |
| 4  | Discount            | 0.720   | 0.1757  | Valid      |
| 5  | Media               | 0.626   | 0       | 0.1757     | Valid       |
| 6  | Event               | Valid   | 0.548   | 0.1757     | 7           |
| 7  | Expedition          | 0.644   | 0.1757  | Valid      |
| 8  | Convenience         | 0.575   | Valid   | 0.1757     | 9           |
| 9  | Features            | 0.609   | 0.1757  | Valid      |
| 10 | Payment             | 0.573   | 0.1757  | Valid      |
| 11 | Authenticity        | 0.566   | 0.1757  | Valid      | Of          |
The eleven strategy attributes that have been tested, it can be seen that all the strategy attributes on the *marketplace* are declared valid.

Table 6. Marketplace Lazada

|        | r alpha | r table | Information |
|--------|---------|---------|-------------|
| 0.829  | 0.1757  | Reliable |

In table VI the value of $r_{\alpha}>0.1757$ i.e. $0.829 > 0.1757$, so the results of the questionnaire.

|Declared| Strategy     | r count | r table | Description |
|--------|--------------|---------|---------|-------------|
|1       | Completeness | 0.633   | 0.1757  | Valid       |
|2       | Brand Image  | 0.1757  | 0.665   | Valid       |
|3       | Affordability| 0.1757  | 0.750   | Valid       |
|4       | Discount     | 0.736   | 0.1757  | Valid       |
|5       | Media        | 0.618   | 0.1757  | Valid       |
|6       | *Event*      | 0.565   | 0.1757  | Valid       |
|7       | Expedition   | 0.686   | 0.1757  | Valid       |
|8       | Convenience  | 0.625   | 0.1757  | Valid       |
|9       | Features     | 0.607   | 0.1757  | Valid       |
|10      | Payment      | 0.534   | 0.1757  | Valid       |
|11      | Authenticity | 0.497   | 0.1757  | Valid       |

From the eleven strategy attributes that have been tested, it can be seen that all the strategy attributes in the *marketplace* Bukalapak are declared valid.

Table 7. Results Of Marketplace Bukalapak

|        | r alpha | r table | Description |
|--------|---------|---------|-------------|
| 0.852  | 0.1757  | Reliable |

In table VIII the value of $r_{\alpha}>0.1757$ i.e. $0.852 > 0.1757$, so the results of the questionnaire.
Of the eleven strategy attributes that have been tested, it can be seen that all the strategy attributes in the marketplace Blibli declared valid.

|Declared| Reliable| r count | r table | Description |
|---|---|---|---|---|
|1| Completeness| Valid| 0.576 0.1757| 2 |
|Brand| Image| 0.1757| 0.684| Valid |
|3| Affordability| 0.693| 0.1757| Valid |
|4| Discount| 0.745| 0.1757| Valid |
|5| Media| 0.669| 0.1757| Valid |
|6| Event| 0.607| 0.1757| Valid |
|7| Expedition| 0.746| 0.1757| Valid |
|8| Convenience| 0.594| 0.1757| Valid |
|9| Features| 0.637| 0.1757| Valid |
|10| Payment| Valid| 0.520 0.1757| 11 |
|Authenticity| 0.484| Valid| 0.1757| From |

Table 8. Results Of Marketplace Blibli

| r alpha | r table | Description |
|---|---|---|
| 0.850 | 0.1757 | Reliable |

In table X the value of $r_{alpha}> 0.1757$ i.e. $0.850 > 0.1757$, so the results of the questionnaire are declared reliable.

2.4 Game Theory Calculations

Data in this study were obtained from the questionnaire results which contains the comparison of each attribute that exists between marketplaces being played. Data processing is Game theory presented in the following table based on the output of POM-QM for windows. In the game between the marketplaces Shopee, Tokopedia, Lazada, Bukalapak and Blibli, there were 10 strategy games, namely Shopee against
Tokopedia, Shopee against Lazada, Shopee against Bukalapak, Shopee against Blibli, Tokopedia against Lazada, Tokopedia against Bukalapak, Tokopedia against Blibli, Lazada against Bukalapak, Lazada against Blibli, and Bukalapak against Blibli, with the following results:

1. Shopee game against Tokopedia

| Table 9. Shopee and Tokopedia |
|-------------------------------|
| Y1  | Y2  | Y4  | Y5  | Y6  | Y7  | Y8  | Y9  | Y1  | Y1  |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| X1  | 0. 13 | 0.1 | 0.13 | 0.12 | 0.14 | 0.01 | 0.0 | 0.04 | 0.12 | 0.01 |
| X2  | 0.09 | 0.3 | 0.03 | 0.08 | 0.33 | 0.14 | 0.2 | 0.07 | 0.33 | 0.07 |

TOKOPE DIA

MATR IX ACCOUN TING VAL UE

X4  | 0.01 | 0.0 | 0.04 | 0.04 | 0.05 | 0.04 | 0.0 | 0.12 | 0.09 | 0.12 |

X5  | 0.08 | 0.0 | 0.01 | 0.04 | 0.12 | 0.13 | 0.3 | 0.09 | 0.16 | 0.12 |

X6  | 0.12 | 0.0 | 0.14 | 0.01 | 0.26 | 0.08 | 0.0 | 0.04 | 0.07 | 0.13 |

0.39 | 0.09 | 0.1 | 0.12 | 0.04 | 0.01 | 0.14 | 0.1 | 0.05 | 0.04 | 0.16 |

X8  | 0.04 | 0.1 | 0.08 | 0.12 | 0.01 | 0.12 | 0.1 | 0.01 | 0.04 | 0.02 |

X10 | 0.02 | 0.0 | 0.12 | 0.03 | 0.04 | 0.09 | 0.0 | 0.15 | 0.08 | 0.01 |

X11 | 0.08 | 0.1 | 0.06 | 0.09 | 0.02 | 0.11 | 0.1 | 0.15 | 0.21 | 0.19 |

0.21 | 0.13 | 0.3 | 0.15 | 0.21 | 0.13 | 0.14 | 0.2 | 0.13 | 0.13 | 0.19 |

(minimax)

Source: primary data processed, 2022
From table XII it can be seen that the maximum value of 0.03 is not the same as the minimum value of 0.12, meaning that the game cannot be solved using pure strategy. The next step is to finish by using a mixed strategy.

### Table 10. Game Results For Mixed Strategy

| Y1  | Y2  | Y4  | Y5  | Y6  | Y7  | Y8  | Y9  | Y1  | Y1  | Mix |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|      |     |     |     |     |     |     |     |     |     |     |
| X1  | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 |     | 0.23 |
| 3    | 3   | 3   | 2   | 4   | 1   | 8   | 4   | 2   | 0   |
| X2  | 0.0 | 0.3 | 0.0 | 0.0 | 0.3 | 0.1 | 0.2 | 0.0 | 0.3 | 0.1 | 0.03 |
| 9    | 6   | 3   | 7   | 3   | 4   | 4   | 7   | 6   | 4   |
| 0.07 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0 |
| 1    | 8   | 8   | 8   | 5   | 2   | 2   | 1   | 3   | 2   |
| X4  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.1 | 0 |
| 1    | 3   | 4   | 4   | 5   | 4   | 6   | 2   | 9   | 2   |
| X5  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0 |
| 8    | 0   | 4   | 4   | 1   | 6   | 8   | 9   | 8   | 0   |
| X6  | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.13 |
| 2    | 4   | 4   | 1   | 6   | 8   | 9   | 8   | 8   | 1   |
|       | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
|       | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
|       | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
|       | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
|       | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
|       | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
|       | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

**Value of game (to row)**

0.0

**Source:** primary data processed, 2022
From the results of the mixed strategy, the game value is 0.09. Shopee needs to implement a marketing strategy of X1 of 0.23 or 23%, X2 of 0.2 or 20%, X6 of 0.13 or 13%, X7 of 0.05 or 5%, X8 of 0.19 or 19%, and X10 of 0.2 or 20% in order to have a maximum profit value of 0.09 or 9%. While the marketplace (Y) needs to implement a marketing strategy of Y1 of 0.24 or 24%, Y3 with a profit of 0.22 or 22%, Y5 of 0.21 or 21%, Y6 of 3%, Y8 of 2% and Y10 of 0.1 or 1% in order to generate a minimum loss of 0.09 or 9%.

2. Shopee game against Lazada

Table 11. Shopee And Lazada Account Value Matrix

|     | Y1  | Y2  | Y3  | Y4  | Y5  | Y6  | Y8  | Y9  | Y1  | Y1  | Min       |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------|
| X1  | 0.3 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00      |
| X2  | 2   | 6   | 4   | 5   | 9   | 0   | 4   | 4   | 9   | 9   | 0.040     |
| X3  | 0.2 | 1   | 0.4 | 0.0 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.1 | 0.00      |
| X4  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00      |
| X5  | 1   | 0.1 | 0.3 | 0.1 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.00      |
| X6  | 5   | 5   | 1   | 6   | 7   | 2   | 4   | 8   | 6   | 0   | 0.00      |
| X7  | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00      |
| X8  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00      |
| X9  | 5   | 7   | 0   | 6   | 4   | 5   | 7   | 6   | 3   | 2   | 0.00      |
| X10 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00      |
| X11 | 0.0 | 0.1 | 0.3 | 0.1 | 0.2 | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 | 0.00      |
|     | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00      |
|     | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00      |
|     | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00      |
|     | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00      |
|     | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00      |
|     | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00      |
|     | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00      |
|     | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00      |
|     | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00      |
|     | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00      |
|     | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00      |
|     | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00      |
|     | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00      |
|     | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00      |
|     | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00      |
|     | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00      |
|     | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00      |
|     | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00      |

(maximun)

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From table XIV it can be seen that the maximum value of 0.01 is not the same as the minimum value of 0.12, meaning that the game cannot be solved using pure strategy. The next step is to finish using a mixed strategy assisted by software POM-QM.

### Table 12. Results

|    | Y1 | Y2 | Y3 | Y4 | Y5 | Y6 | Y8 | Y9 | Y10 | Y11 | Mix |
|----|----|----|----|----|----|----|----|----|-----|-----|-----|
| X1 | 0.3| 0.0| 0.1| 0.1| 0.0| 0.1| 0.0| 0.0| 0.00 | 0.00 | 0.21|
|    | 2  | 6  | 4  | 5  | 9  | 0  | 4  | 9  | 0   | 0   |     |
| X2 | 0.0| 0.1| 0.4| 0.0| 0.0| 0.0| 0.0| 0.0| 0.00 | 0.00 |     |
|    | 9  | 2  | 8  | 4  | 8  | 12 | 8  | 12 | 4   |     | X   |
| Row| MI ST VA FO GA ME 6 13 8 04 7 |
|    | XE TE UE RE ME 0   0   0   0   0 |
| X4 | 0.1| 0.1| 0.3| 0.1| 0.1| 0.0| 0.1| 0.0| 0.00 | 0.00 | 0.01|
|    | 2  | 3  | 1  | 4  | 1  | 1  | 12 | 3  | 08  | 8   |     |
| X5 | 0.1| 0.0| 0.1| 0.0| 0.1| 0.1| 0.0| 0.0| 0.00 | 0.00 | 0.1  |
|    | 5  | 5  | 1  | 6  | 7  | 2  | 04 | 8  | 06  | 0   |     |
| X6 | 0.0| 0.1| 0.0| 0.1| 0.0| 0.1| 0.0| 0.0| 0.00 | 0.00 |     |
|    | 2  | 3  | 9  | 2  | 7  | 0  | 12 | 4  | 08  | 8   |     |
| X7 | 0.1| 0.1| 0.1| 0.1| 0.1| 0.1| 0.1| 0.0| 0.00 | 0.00 | 0.01|
|    | 2  | 3  | 9  | 8  | 12 | 0  | 0  | 8  | 07  | 5   |     |
| X8 | 0.0| 0.0| 0.1| 0.0| 0.2| 0.1| 0.0| 0.0| 0.00 | 0.00 | 0.35|
|    | 5  | 7  | 6  | 4  | 5  | 07 | 6  | 13 | 2   |     |     |
| X9 | 0.0| 0.0| 0.1| 0.0| 0.1| 0.1| 0.0| 0.0| 0.00 | 0.00 | 0   |
|    | 7  | 8  | 8  | 2  | 2  | 14 | 8  | 08 | 8   |     |     |
| X11| 0.0| 0.1| 0.3| 0.1| 0.2| 0.0| 0.0| 0.0| 0.00 | 0.00 | 0.39|
|    | 4  | 5  | 2  | 1  | 6  | 16 | 8  | 08 | 0.1  |     |     |
| Column| 0  | 0  | 0  | 0  | 5  | 0  | 3  | 0  |     |     |     |

Source: primary data processed, 2022
From the results of the mixed strategy, the game value is 0.1. Shopee needs to implement a marketing strategy of $X_1$ of 0.21 or 21%, $X_2$ of 0.03 or 3%, $X_4$ of 0.01 or 1%, $X_7$ of 0.01 or 1%, $X_8$ of 0.35 or 35%, and $X_{11}$ of 0.39 or 39% in order to have a maximum profit value of 0.1 or 10%. While the marketplace ($Y$) needs to implement a marketing strategy of $Y_2$ with a profit of 0.15 or 15%, $Y_4$ with a profit of 0.31 or 31%, $Y_6$ of 0.13 or 13%, $Y_8$ of 0.05 or 5%, $Y_9$ of 0.04 or 4% and $Y_{10}$ of 0.32 or 32% in order to generate a minimum loss of 0.1 or 10%.

3. Shopee game against Bukalapak

| Table 13. Bukalapak |
|---------------------|
| Y1  | Y2  | Y3  | Y4  | Y5  | Y6  | Y7  | Y9  | Y1  | Y1  | Min |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| X1  | 0.2 | 0.0 | 0.0 | 0.4 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.4 | 0.01 |
| X2  | 0.0 | 0.0 | 0.1 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | _    |
| X4  | 0   | 5   | 5   | 8   | 3   | 7   | 3   | 2   | 3   | 9   | 0.00 |
| X5  | 0.0 | 0.0 | 0.2 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.01 |
| X6  | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 | 0.0 | 0.2 | 0.0 | 0.2 | _    |
| X8  | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | _    |
| X9  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | _    |
| X1  | 0.0 | 0.0 | 0.0 | 0.1 | 0.2 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.01 |
| X1  | 0.0 | 0.0 | 0.0 | 0.1 | 0.2 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.02 |
| X1  | 0.0 | 0.0 | 0.0 | 0.1 | 0.2 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.02 |
| X1  | 0.0 | 0.1 | 0.2 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.07 |
| X1  | 0.0 | 0.0 | 0.0 | 0.1 | 0.2 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | _    |
| X1  | 0.0 | 0.0 | 0.0 | 0.1 | 0.2 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.02 |
| X1  | 0.0 | 0.1 | 0.2 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | _    |
| X1  | 0.0 | 0.0 | 0.0 | 0.1 | 0.2 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | _    |
| X1  | 0.0 | 0.0 | 0.0 | 0.1 | 0.2 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.02 |
| X1  | 0.0 | 0.0 | 0.0 | 0.1 | 0.2 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | _    |
| X1  | 0.0 | 0.0 | 0.0 | 0.1 | 0.2 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.02 |
| X1  | 0.0 | 0.0 | 0.0 | 0.1 | 0.2 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | _    |
| X1  | 0.0 | 0.0 | 0.0 | 0.1 | 0.2 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.02 |
| X1  | 0.0 | 0.0 | 0.0 | 0.1 | 0.2 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | _    |
| X1  | 0.0 | 0.0 | 0.0 | 0.1 | 0.2 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.02 |
| X1  | 0.0 | 0.0 | 0.0 | 0.1 | 0.2 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | _    |
| X1  | 0.0 | 0.0 | 0.0 | 0.1 | 0.2 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.02 |
| X1  | 0.0 | 0.0 | 0.0 | 0.1 | 0.2 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | _    |
From table XVI it can be seen that the maximum value of 0.02 is not the same as the minimum value of 0.16 meaning the game cannot be solved using pure strategy. The next step is to finish using a mixed strategy assisted by *software* POM-QM

| Y1  | Y2  | Y3  | Y4  | Y5  | Y6  | Y7  | Y9  | 0   | 1   | Mix |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| X1  | 0.2 | 0.0 | 0.0 | 0.4 | 0.0 | 0.1 | 0   | 0.0 | 0.0 | 0.4 |
| X2  | 0.0 | 0.0 | 0.1 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| X3  | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0   | 0.0 | 0.0 | 0.0 |
| X4  | 0.4 | 0.0 | 0.2 | 0.1 | 0.0 | 0.0 | 0   | 0.2 | 0.0 | 0.0 |
| X5  | 0.0 | 0.0 | 0.2 | 0.1 | 0.0 | 0.0 | 0   | 0.0 | 0.0 | 0.0 |
| X6  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

| Column | 0.3 | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
|--------|-----|-----|-----|-----|-----|-----|-----|

| Value of game (to row) | 0.0 |
|------------------------|-----|
|                        | 8   |
Source: primary data processed, 2022

From the results of the mixed strategy, the game value is 0.08. Shopee needs to implement a marketing strategy of X3 of 0.1 or 10%, X5 of 0.17 or 17%, X6 of 0.15 or 15%, X7 of 0.1 or 10%, X9 of 0.15 or 15%, and X10 of 0.33 or 33% in order to have a maximum profit value of 0.08 or 8% While marketplace Bukalapak (Y) needs to implement a marketing strategy of Y2 with a profit of 0.02 or 2%, Y3 with a profit of 0.32 or 32%, Y6 of 0.08 or 8%, Y7 of 0.33 or 33%, Y8 of 0.2 or 20% and Y9 of 0.05 or 5% in order to generate a minimum loss of 0.08 or 8%.

4. Shopee game against Blibli

|   | Y2 | Y3 | Y4 | Y5 | Y6 | Y7 | Y8 | Y9 | Y10 | Y11 | Min |
|---|----|----|----|----|----|----|----|----|-----|-----|-----|
| X1| 5  | 6  | 6  | 0  | 3  | 4  | 0  | 9  | 2   | 1   | 0.04|
| X2| 6  | 5  | 8  | 1  | 8  | 0  | 4  | 0  | 9   | 0.20|

Table 15, Blibli

|   | Y2 | Y3 | Y4 | Y5 | Y6 | Y7 | Y8 | Y9 | Y10 | Min |
|---|----|----|----|----|----|----|----|----|-----|-----|
| X4| 9  | 8  | 8  | 2  | 3  | 8  | 2  | 1  | 2   | 0.02|
| X5| 0  | 0  | 0  | 1  | 7  | 7  | 9  | 8  | 8   | 0.07|
| X6| 7  | 4  | 7  | 5  | 7  | 8  | 6  | 3  | 3   | 0.04|

From the analysis, the minimax value is 0.00.
From table XVI it can be seen that the maximum value of 0.07 is not the same as the minimum value of 0.26 meaning the game cannot be solved using pure strategy. The next step is to finish using a mixed strategy assisted by software POM-QM.

| X1  | Y2  | Y3  | Y4  | Y5  | Y6  | Y7  | Y8  | Y9  | Y1  | Y1  | Row Mix |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---------|
|     | 0.0 | 0.2 | 0.0 | 0.3 | 0.2 | 0.0 | 0.2 | 0.0 | 0.3 | 0.1 | 0.18   |
|     | 1.8 |     |     |     |     |     |     |     |     |     |         |
| X2  | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.3 | 0.0 | 0.2 | 0.1 | 0.1 | 0.00    |
|     | 0   |     |     |     |     |     |     |     |     |     |         |
| X3  | 0.1 | 0.0 | 0.1 | 0.0 | 0.2 | 0.0 | 0.1 | 0.1 | 0.0 | 0.1 | 0.00    |
|     | 0   |     |     |     |     |     |     |     |     |     |         |
| X4  | 0.1 | 0.0 | 0.1 | 0.2 | 0.2 | 0.1 | 0.0 | 0.3 | 0.1 | 0.1 | 0.16   |
|     | 0.39|     |     |     |     |     |     |     |     |     |         |
| X5  | 0.1 | 0.2 | 0.3 | 0.3 | 0.1 | 0.0 | 0.2 | 0.1 | 0.0 | 0.1 | 0.39   |
|     | 0   |     |     |     |     |     |     |     |     |     |         |
| X6  | 0.0 | 0.1 | 0.0 | 0.2 | 0.0 | 0.1 | 0.0 | 0.0 | 0.3 | 0.0 | 0.01   |
|     | 0   |     |     |     |     |     |     |     |     |     |         |
| X7  | 0.1 | 0.2 | 0.2 | 0.0 | 0.2 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.00    |
|     | 0   |     |     |     |     |     |     |     |     |     |         |
| X8  | 0.0 | 0.1 | 0.3 | 0.1 | 0.0 | 0.0 | 0.3 | 0.0 | 0.1 | 0.1 | 0.00    |
|     | 0   |     |     |     |     |     |     |     |     |     |         |
| X9  | 0.5 | 0.1 | 0.1 | 0.2 | 0.0 | 0.2 | 0.0 | 0.1 | 0.0 | 0.2 | 0.04   |
|     | 0   |     |     |     |     |     |     |     |     |     |         |
| X10 | 0.3 | 0.0 | 0.0 | 0.1 | 0.2 | 0.0 | 0.3 | 0.0 | 0.2 | 0.0 | 0.21   |
|     | 0   |     |     |     |     |     |     |     |     |     |         |

**Source:** primary data processed, 2022
From the results of the mixed strategy, the game value is 0.16. Shopee needs to implement a marketing strategy of X1 of 0.18 or 18%, X4 of 0.16 or 16%, X5 of 0.39 or 39%, X6 of 0.01 or 1%, X9 of 0.04 or 4%, and X10 of 0.21 or 21% in order to have a maximum profit value of 0.08 or 8%. While the marketplace (Y) needs to implement a Y2 marketing strategy with a profit of 0.11 or 11%, Y3 with a profit of 0.16 or 16% , Y4 of 0.21 or 21%, Y6 of 0.38 or 38%, Y7 of 0.05 or 5% and Y8 of 0.1 or 10% in order to generate a minimum loss of 0.08 or 8%.

5. game against Lazada

| Value of game (to row) |  
|-----------------------|
| 0.1                   |
| 6                     |

Source: primary data processed, 2022

| Lazada | Y1 | Y2 | Y4 | Y5 | Y6 | Y7 | Y8 | Y9 | Y1  | Y1  | Min |
|--------|----|----|----|----|----|----|----|----|-----|-----|-----|
| X1     | 0.3| 0.0| 0.1| 0.0| 0.0| 0.3| 0.0| 0.0| 0.1  | 0.0  | 2   |
|        | 4  | 6  | 3  | 6  | 4  | 4  | 5  | 5  | 5    | 2    | 0.02|
| X2     | 0.1| 0.2| 0.0| 0.1| 0.0| 0.0| 0.0| 0.0|       |     |     |
|        | 3  | 8  | 8  | 1  | 52 | 6  | 0  | 0   |      |     |     |
| MA     | Tok|    |    |    |    |    |    |    |      |     |     |
| TRI    |    |    |    |    |    |    |    |    |      |     |     |
| X      |    |    |    |    |    |    |    |    |      |     |     |
| X5     | 0.4| 0.0| 0.0| 0.1| 0.0| 0.1| 0.0| 0.1| 0.2  | 0.2  | 0.06|
|        | 5  | 8  | 6  | 1  | 7  | 0  | 1  | 2  | 5    | 8    |     |
| X6     | 0.0| 0.3| 0.1| 0.0| 0.1| 0.0| 0.0| 0.1| 0.0  | 0.2  |     |
|        | 7  | 2  | 2  | 4  | 0  | 4  | 9  | 2  | 0    | 7    | 0.00|

Minimax

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From table XXII it can be seen that the maximum value of 0.06 is not the same as the minimum value of 0.13 meaning the game cannot be solved using pure strategy. The next step is to finish using a mixed strategy assisted by software POM-QM.

Table 17: Game

| X1  | 0.0 | 0.2 | 0.0 | 0.1 | 0.2 | 0.2 | 0.3 | 0.0 | 0.0 | 0.01 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| 1   | 4.0 | 4.0 | 4.0 | 4.0 | 3.0 | 2.0 | 3.0 | 4.0 | 0.0 | 0.0  |
| _   | 0.3 | _   | _   | 4.0 | 2.0 | 5.0 | 0.7 | 5.0 | 8.0 |      |

(Maximum)

Source: primary data processed, 2022
From the results of the mixed strategy, the game value is 0.1. Tokopedia needs to implement a marketing strategy of X1 of 0.36 or 36%, X2 of 0.12 or 12%, X5 of 0.01 or 1%, X6 of 0.28 or 28%, and X11 of 0.22 or 22% in order to have a maximum profit value of 0.1 or 10%. Meanwhile marketplace (Y) needs to implement a marketing strategy of Y3 with a profit of 0.58 or 58%, Y4 with a profit of 0.14 or 14%, Y5 of 0.09 or 9%, Y9 of 14%, and Y10 of 0.05 or 5% in order to generate a minimum loss of 0.1 or 10%.

6. **Tokopedia game against Bukalapak**

Table 18. Tokopedia And Bukalapak Earning Value Matrix

|    | Y1 | Y3 | Y4 | Y5 | Y6 | Y7 | Y8 | Y9 | Y1 | Y1 | Min |
|----|----|----|----|----|----|----|----|----|----|----|-----|
| X1 | 0.2| 0.0| 0.3| 0.1| 0.1| 0.0| 0.0| 0.0| 0.0| 0.3| 0.03 |
| X2 | 0.0| 0.2| 0.0| 0.0| 0.0| 0.1| 0.1| 0.2| 0.1| 0.0| 0.03 |
| X5 | 0.1| 0.0| 0.1| 0.1| 0.0| 0.0| 0.3| 0.3| 0.3| 0.2| 0.03 |
| X6 | 0.2| 0.0| 0.1| 0.2| 0.0| 0.0| 0.3| 0.2| 0.2| 0.0| 0.03 |
| X7 | 0.1| 0.2| 0.2| 0.0| 0.0| 0.0| 0.2| 0.2| 0.0| 0.0| 0.03 |
| X9 | 0.1| 0.0| 0.0| 0.1| 0.0| 0.0| 0.3| 0.2| 0.0| 0.0| 0.02 |
| X1 | 0.0| 0.1| 0.0| 0.0| 0.1| 0.0| 0.2| 0.2| 0.2| 0.2| 0.02 |
| 0  | 4  | 8  | 7  | 9  | 2  | 2  | 3  | 9  | 9  | 7  | 0.02 |
From table XIV it can be seen that the maximum value of 0.05 is not the same as the minimum value of 0.18 meaning the game cannot be solved using pure strategy. The next step is to finish using a mixed strategy assisted by software POM-QM.

### Table 19. Game Result

| Y1 | Y3 | Y4 | Y5 | Y6 | Y7 | Y8 | Y9 | Y1 | Y1 | Mix |
|----|----|----|----|----|----|----|----|----|----|-----|
| X1 | 0.2 | 0.3 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.3 | 0.05 |
|    | 6   | 8   | 5   | 5   | 5   | 5   | 8   | 4   | 6   | 0.28 |
| Max | 0.2 | 0.1 | 0.2 | 0.2 | 0.1 | 0.1 | 0.3 | 0.3 | 0.3 | (Maxm) |
| x  | 9   | 4   | 8   | 1   | 8   | 2   | 2   | 4   | 1   | 5   |

Source: primary data processed, 2022
From the results of the mixed strategy, the game value is 0.09. Tokopedia needs to implement a marketing strategy of X1 of 0.04 or 4%, X2 of 0.11 or 11%, X6 of 0.12 or 12%, X10 of 0.38 or 38%, and X11 of 0.35 or 35% in order to have a maximum profit value of 0.09 or 9%. While the marketplace (Y) needs to implement a marketing strategy of Y2 with a profit of 0.02 or 2%, Y5 with a profit of 0.14 or 14%, Y6 with a profit of 0.2 or 20%, Y7 of 0.53 or 53%, and Y8 of 0.1 or 10% in order to generate a minimum loss of 0.09 or 9%.

1. Tokopedia Game against Blibli

**Table 20. Tokopedia And Blibli's Earning Value Matrix**

|   | Y2 | Y3 | Y4 | Y5 | Y6 | Y7 | Y8 | Y9 | Y1  | Y1  | Min |
|---|----|----|----|----|----|----|----|----|-----|-----|-----|
| X2| 0.1| 0.0| 0.0| 0.1| 0.1| 0.0| 0.0| 0.0| 0.0  | 0.1  | 0.02|
| X3| 0.1| 0.0| 0.1| 0.0| 0.0| 0.0| 0.1| 0.0| 0.1  | 0.0  | 0.0 |
|   | 8  | 7  | 4  | 8  | 92 | 7  | 6  | 2  | 7   | 4   | 0   |
| X5| 0.0| 0.1| 0.1| 0.0| 0.0| 0.0| 0.1| 0.0| 0.1  | 0.0  | 0.01|
| X6| 8  | 5  | 0  | 2  | 3  | 9  | 0  | 5  | 1   | 7   | 0.04|
| X7| 0.0| 0.0| 0.0| 0.1| 0.0| 0.1| 0.0| 0.0| 0.0  | 0.0  | 0.02|
|   | 6  | 2  | 7  | 7  | 4  | 7  | 2  | 7  | 4   | 4   | 0.02|
| X9| 0.0| 0.1| 0.1| 0.0| 0.0| 0.2| 0.2| 0.0| 0.2  | 0.0  | 0.01|
| X1| 0.0| 0.0| 0.0| 0.0| 0.0| 0.0| 0.0| 0.0| 0.0  | 0.0  | 0.02|

Source: primary data processed, 2022
From table XVI it can be seen that the maximum value of 0.05 is not the same as the minimum value of 0.17 meaning the game cannot be solved using pure strategy. The next step is to finish using a mixed strategy assisted by software POM-QM.

**Table 21. Results Of Game Value For Mixed Strategy**

|    | Y2 | Y3 | Y4 | Y5 | Y6 | Y7 | Y8 | Y9 | Y1 | Y1 | Row Mix |
|----|----|----|----|----|----|----|----|----|----|----|---------|
| X2 | 0.1| 0.0| 0.0| 0.1| 0.0| 0.0| 0.0| 0.0| 0.0| 0.1| 0.14    |
| X3 | 0.1| 0.0| 0.1| 0.0| 0.0| 0.0| 0.0| 0.0| 0.0| 0.0| 0.1     |
| X4 | 0.1| 0.0| 0.2| 0.2| 0.2| 0.0| 0.0| 0.0| 0.0| 0.0| 0.0     |
| X5 | 0.0| 0.1| 0.1| 0.0| 0.0| 0.0| 0.0| 0.0| 0.1| 0.2| 0.0     |
| X6 | 0.0| 0.0| 0.2| 0.0| 0.0| 0.0| 0.0| 0.0| 0.0| 0.2| 0.04    |
| X7 | 0.0| 0.0| 0.1| 0.0| 0.1| 0.0| 0.0| 0.0| 0.0| 0.0| 0.1     |
| X8 | 0.0| 0.1| 0.0| 0.1| 0.0| 0.2| 0.2| 0.2| 0.2| 0.1| 0.2     |
| X9 | 0.0| 0.1| 0.1| 0.0| 0.0| 0.0| 0.0| 0.0| 0.0| 0.0| 0.0     |
| X10| 0.1| 0.1| 0.0| 0.0| 0.0| 0.0| 0.0| 0.0| 0.0| 0.0| 0.2     |
| X11| 0.1| 0.0| 0.0| 0.0| 0.0| 0.1| 0.0| 0.1| 0.1| 0.1| 0.0     |

- **Column mix**
  - 0.2
  - 0.1
  - 0.3
  - 0.0
  - 0.0
  - 0.0
  - 0.0
  - 0.0
  - 0.0
  - 0.0

Source: primary data processed, 2022
From the results of the mixed strategy, the game value is 0.09. Tokopedia needs to implement a marketing strategy of X2 of 0.14 or 14%, X3 of 0.1 or 10%, X6 of 0.04 or 4%, X7 of 0.29 or 29%, X8 of 0.21 or 21% and X10 of 0.21 or 21% in order to have a maximum profit value of 0.09 or 9%. While the marketplace (Y) needs to implement a Y2 marketing strategy with a profit of 0.24 or 24%, Y3 with a profit of 0.1 or 10%, Y4 is 0.18 or 18%, Y5 is 0.32 or 32%, Y6 is 0.09 or 9% and Y9 is 0.07 or 7% in order to generate a minimum loss of 0.09 or 9%.

2. Lazada vs Bukalapak Game

| Value of game (to row) | Y1 | Y2 | Y3 | Y5 | Y6 | Y7 | Y8 | Y9 | Y1 | Y1 | Min |
|------------------------|----|----|----|----|----|----|----|----|----|----|-----|
| X1                     | 0  | 0.1| 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0.1 |
|                        | 7  | 9  | 8  | 2  | 6  | 5  | 5  | 2  | 3  | 0  | 0.02|
| X2                     | 0  | 0  | 0  | 6  | 6  | 4  | 0  | 7  | 64 | .  | E LAZADA |

Source: primary data processed, 2022
From table XXVIII it can be seen that the maximum value of 0.05 is not the same as the minimum value of 0.15, meaning that the game cannot be solved using pure strategy. The next step is to finish using a mixed strategy assisted by software POM-QM.

Table 23. Game Results For Mixed Strategy

|     | Y1   | Y2   | Y3   | Y5   | Y6   | Y7   | Y8   | Y9   | Y1   | Y1   | Row | Mix |
|-----|------|------|------|------|------|------|------|------|------|------|-----|-----|
| X1  | 0.0  | 0.1  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.1  | 0.0  | 0   | 0.05|
| X2  | 0.1  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.1  | 0   | 0.03|
| X4  | 0.0  | 0.0  | 0.1  | 0.1  | 0.1  | 0.1  | 0.0  | 0.0  | 0.1  | 0.0  | 0   | 0.07|
| X5  | 0.1  | 0.0  | 0.1  | 0.2  | 0.4  | 0.1  | 0.1  | 0.0  | 0.1  | 0.0  | 0   | 0.02|
| X6  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0   | 0.06|
| X8  | 0.0  | 0.0  | 0.1  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.1  | 0.0  | 0   | 0.03|
| X9  | 0.1  | 0.2  | 0.1  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0   | 0.04|
| X11 | 0.2  | 0.1  | 0.0  | 0.2  | 0.0  | 0.2  | 0.0  | 0.3  | 0.0  | 0.0  | 0   | 0.06|

Source: primary data processed, 2022.
From the results of the mixed strategy, the game value is 0.11. Lazada needs to implement a marketing strategy of X4 of 0.13 or 13%, X5 of 0.21 or 21%, X8 of 0.3 or 30%, and X11 of 0.36 or 36% in order to have a maximum profit value of 0.11 or 11%. Meanwhile marketplace (Y) needs to implement a marketing strategy of Y1 with a profit of 0.06 or 6%, Y2 with a profit of 0.03 or 3%, Y3 of 0.22 or 22%, Y8 of 0.41 or 41%, and Y11 of 0.27 or 27% in order to generate a minimum loss of 0.11 or 11%.

### 3. Game Lazada vs Blibli

**Table 24. Lazada And Blibli Earning Value Matrix**

|     | Y1 | Y2 | Y4 | Y5 | Y6 | Y7 | Y8 | Y9 | Y1 | Y1 | Min |
|-----|----|----|----|----|----|----|----|----|----|----|-----|
| X1  | 0.0| 0.1| 0.0| 0.1| 0.0| 0.1| 0.0| 0.1| 0.1| 0.0| 0.05|
|     | 8  | 7  | 9  | 0  | 5  | 2  | 9  | 7  | 5  | 7  |      |
| X2  | 0.2| 0.1| 0.0| 0.0| 0.1| 0.0| 0.2| 0.2| 0.0| 0.2| 0.09|
|     | 0  | 0  | 4  | 9  | 4  | 9  | 4  | 4  | 4  | 3  |      |
| X   | 0.2| 0.2| 0.0| 0.1| 0.0| 0.1| 0.1| 0.1| 0.1| 0.1| 0.05|
|     | 1  | 1  | 7  | 0  | 5  | 3  | 5  | 2  | 9  | 0  |      |
| X4  | 0.1| 0.0| 0.2| 0.0| 0.0| 0.1| 0.1| 0.2| 0.0| 0.1| 0.06|
|     | 2  | 7  | 1  | 7  | 7  | 1  | 6  | 0  | 6  | 6  |      |
| X5  | 0.1| 0.1| 0.2| 0.2| 0.1| 0.4| 0.1| 0.1| 0.0| 0.1| 0.09|
|     | 0  | 3  | 0  | 6  | 3  | 0  | 3  | 2  | 9  | 6  |      |
| X6  | 0.0| 0.0| 0.1| 0.0| 0.0| 0.1| 0.0| 0.0| 0.0| 0.0| 0.10|
|     | 5  | 6  | 0  | 6  | 5  | 7  | 6  | 9  | 8  |    |      |
| X8  | 0.1| 0.1| 0.1| 0.0| 0.0| 0.1| 0.0| 0.1| 0.1| 0.0| 0.04|
|     | 2  | 6  | _  | _  | _  | 5  | 7  | 6  | 6  | 7  |      |
| X9  | 0.0| 0.1| 0.0| 0.0| 0.0| 0.1| 0.1| 0.0| 0.1| 0.0| 0.06|
|     | 9  | 2  | 6  | 6  | 7  | 4  | 8  | 6  | 7  | 9  |      |
|     | 0.2| 0.2| 0.1| 0.0| 0.0| 0.1| 0.1| 0.1| 0.2| 0.0| 0.04|
| Min |    |    |    |    |    |    |    |    |    |    |      |

Source: primary data processed, 2022

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From table XXX it can be seen that the maximum value of 0.04 is not the same as the minimum value of 0.15, meaning that the game cannot be solved using pure strategy. The next step is to finish using a mixed strategy assisted by software POM-QM.

**Table 25. Results Of Game Value For Mixed Strategy**

| X1 | Y1   | Y2   | Y4   | Y5   | Y6   | Y7   | Y8   | Y9   | Y1   | Y1   | Row | Mix |
|----|------|------|------|------|------|------|------|------|------|------|-----|-----|
| 0.2| 0.1  | 0.2  | 0.2  | 0.1  | 0.0  | 0.1  | 0.2  | 0.1  | 0.0  | 0.0  | 0   |     |
| 0.2| 0.2  | 0.2  | 0.1  | 0.4  | 0.3  | 0.4  | 0.2  | 0.1  | 0.0  | 0.0  | 0.12|     |
| 0  | 0.2  | 0   | (    | 6       | 5       | 0   | 9   | 2   | 6   | 7   | 0.25|     |

Source: primary data processed, 2022
From the results of the mixed strategy, the game value is 0.13. Lazada needs to implement a marketing strategy of X3 of 0.23 or 23%, X5 of 0.45 or 45%, X7 of 0.25 or 25%, and X11 of 0.08 or 8% in order to have a maximum profit value of 0.13 or 13%. While marketplace (Y) needs to implement a marketing strategy of Y1 with a profit of 0.11 or 11%, Y3 with a profit of 0.12 or 12%, Y5 of 0.75 or 75%, and Y9 of 0.01 in order to resulting in a minimum loss of 0.13 or 13%.

4. Bukalapak Game against Blibli

| Column mix | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.3 | 0.1 |
|------------|-----|-----|-----|-----|-----|-----|-----|-----|
|            | 75  | 2   | 75  | 0   | 0   | 1   | 0   | 0   |

Value of game (to row) | 0.1 | 3 |

Source: primary data processed, 2022
From table XXXII it can be seen that the maximum value of 0.01 is not the same as the minimum value of 0.16 meaning the game cannot be solved using pure strategy. The next step is to finish using a mixed strategy assisted by software POM-QM.

Table 28. Game

| X0.04 | 0.1 0.2 0.6 0.9 0.9 0.1 0.3 |
|-------|-------------------------------|
|       | Minima (0.1 0.1 0.2 0.2 0.3 0.1 |
|       | Maxima (0.0 0.6 0.0 0.8 0.5 0.7 |

**Source:** processed primary data, 2022

|       | Y2  Y3  Y4  Y5  Y6  Y7  Y8  Y9  Y1  Y1 |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| X1    | 0.3 | 0.3 | 0.3 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.1 |
|       | 8   | 9   | 6   | 3   | 3   | 26  | 8   | 35  | 7   |
| X2    | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 |
|       | 1   | 2   | 2   | 6   | 6   | 7   | 09  | 0   | 08  |
|       | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
|       | 0.2 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

**Row:**

| X4    | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.0 | 0.0 |
|       | 1   | 5   | 5   | 8   | 3   | 4   | 07  | 0   | 04  |
| X5    | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
|       | 4   | 2   | 3   | 1   | 9   | 3   | 06  | 6   | 12  |
| X6    | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 |
|       | 4   | 2   | 3   | 1   | 7   | 2   | 02  | 02  | 02  |
|       | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| X6    | 4   | 9   | 3   | 1   | 6   | 0   | 0.1 | 5   | 10  |
|       | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| X8    | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

**Column:**

| Y1  | 0.76 |
| X0.1| 0.00 |
| X0.2| 0.00 |
| X0.3| 0.00 |
| X0.4| 0.00 |
| X0.5| 0.00 |
| X0.6| 0.00 |
| X0.7| 0.00 |

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From the results of the mixed strategy, the game value is 0.14. Bukalapak needs to implement a marketing strategy of X1 of 0.76 or 76%, X2 of 0.21 or 21%, and X9 of 0.03 or 3% in order to have a maximum profit value of 0.14 or 14% While the marketplace (Y) needs to implement Y5 marketing strategy with a profit of 0.79 or 79%, Y6 of 0.15 or 15%, and Y11 of 0.06 or 6% in order to generate a minimum loss of 0.14 or 14%.

4. Conclusion

From the analysis and discussion that has been described, it can be concluded that the game between marketplaces uses a mixed strategy. In the Shopee and Tokopedia games, the optimal game value is 9%. We recommend that the Shopee company need to implement a strategy of 23% product completeness, 20% Brand Image, 13% Event, 5% Expedition, 19% Convenience and 20% Authenticity. Meanwhile, Tokopedia applies a strategy of 24% product completeness, 22% discount, 21% media, 30% expedition, 3% features and 1% authenticity. In the second game, Shopee and Lazada, the optimal game value is 10%. We recommend that Shopee companies need to implement a strategy of 21% product completeness, 3% brand image, 1% discount, 1% expedition, 35% convenience, and 39% authenticity. Meanwhile, Lazada applies a 15% brand image strategy, 31% discount, event, 5% convenience, 4% features, 32% payment. In Shopee and Bukalapak games, the optimal game value is 8%. We recommend that Shopee companies need to implement a 10% Affordability strategy, 17% Media, Events, 10% Expeditions. Features 15%, and Authenticity 33%. Meanwhile, Bukalapak needs to implement a strategy of 2% Brand Image, 32% Affordability, Events, 33% Expeditions, 20% Features, and 5% Payments. In the Shopee and Blibli games, the optimal game value is 16%. We recommend that Shopee companies need to implement a strategy of 18% product completeness, 16% discount, 39% media, events, 4% features and 4% payments. Meanwhile, Blibli needs to implement a strategy of 11% Brand Image, 16% Affordability, 21% Discount, 38% Event, 5% Expedition, and 10% Convenience.

In the Tokopedia and Lazada games, the optimal game value is 10%. It is recommended that Tokopedia companies need to implement a strategy of 36% product completeness, 12% brand image, 1% media, event, and 22% authenticity. Meanwhile, Lazada needs to
implement a 58% discount strategy, 14% media, events, 14% features, and 5% payments. In the Tokopedia and Bukalapak games, the optimal game value is 9%. It is recommended that the Tokopedia company implement a strategy of 4% product completeness, 11% brand image, event, 38% payment, and 35% authenticity. Meanwhile, Bukalapak applies a 2% discount strategy, 14% media, 20% events, 53% expeditions, and 10% convenience. In the Tokopedia and Blibli games, the optimal game value is 9%. It is recommended that the Tokopedia company implement a strategy of Completeness 14%, Brand Image 10%, Events 4%, Expeditions 29%, Convenience 21%, and Payments 21%. Meanwhile, Blibli applies a strategy of 24% Brand Image, 10% Affordability, 18% Discount, 32% Media, Events, and Features. 7%. In the Lazada and Bukalapak games, the optimal game value is 11%. We recommend that Lazada implement a marketing strategy of 13% Discount, 21% Media, 30% Convenience, and 36% Authenticity. Meanwhile, Bukalapak applies a strategy of 6% Product Completeness, 3% Brand Image, 22% Affordability, 41% Convenience, and 27% Authenticity. In the Lazada and Blibli games, the optimal game value is 13%. We recommend that Lazada apply the 23% Affordability, 45% Media, 25% Expedition, and 8% Convenience strategies. Meanwhile, Blibli applies a strategy of 11% product completeness, 12% discount, event, and 1% features. In the last game, Bukalapak and Blibli, the optimal game value was 14%. It is recommended that Bukalapak implement a 76% product completeness strategy, 21% brand image, and 3% features. Meanwhile, Blibli applies 79% Media, Event, and 6% Authenticity strategies.

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