The Concept of Game Theory in Determining the Competition Strategy for Gojek and Grab Online Transportation Services

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Abstract. In 2021, Gojek and Grab emerged as the leading and most widely embraced online transportation service providers. Their shared commitment to meeting customer needs fueled intense competition, prompting both companies to enhance their respective advantages. A crucial aspect of gaining a competitive edge lay in the formulation of effective marketing strategies. This study aimed to ascertain the superior marketing strategy between Gojek and Grab, examining the perspective of students from the Faculty of Mathematics and Natural Sciences at Universitas Syiah Kuala (FMIPA-USK) using the framework of game theory. The respondents, comprising 338 even-semester students from the 2020/2021 academic year, were selected through stratified random sampling. The findings revealed a mixed strategy, with both players converging on the same saddle point, specifically at a value of 71. This saddle point represented the optimal game value for both companies, indicating the ideal marketing strategy based on the preferences of FMIPA-USK students as users of online transportation services. For Gojek, the optimal strategy involved a cost-effective approach at 43.1% and a convenience-focused strategy at 56.7%. In contrast, Grab's optimal strategy leaned towards a security-oriented approach with a probability of 97.6% and a promotional strategy at 2.2%. This comprehensive analysis sheds light on the nuanced preferences of the target audience and provides insights into the tailored marketing strategies that can effectively resonate with FMIPA-USK students.

Keywords: Business Competition, Game Theory, Online Transportation

1 Introduction

The era of globalization accompanied by a rapidly increasing population has become a great opportunity for the development of a business, whether it is a company that offers products or services. The service business is one of the business fields that enliven the competition [1]. Many service companies are starting to appear in Indonesia, one of which is transportation services. Transportation services have now become a necessity

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for society because they can make it easier for someone to carry out their activities [2]. The ease and speed of getting transportation services is an advantage of online transportation and a consideration for people in choosing transportation services [3].

Online transportation is in great demand by the public because it has the advantage that it can be ordered via an online-based application, where customers can find out the complete identity data of the driver or drivers concerned [4]. For urban communities, the public transportation options available are very diverse. Online transportation is an alternative that can make it easier for users to travel to any place they want, unlike public transportation where stops are predetermined. Initially online transportation could only be enjoyed in big cities in Indonesia until now online transportation has spread widely throughout almost all of Indonesia, including Aceh Province.

Universitas Syiah Kuala (USK) is the oldest state university in Aceh Province, precisely in the student city (Kopelma) Darussalam. The FMIPA-USK is one of 12 faculties at USK which was officially established on October 22, 1993. Students are busy with lectures and other activities. The dense lecture activities make students take advantage of existing service facilities, such as transportation services in order to facilitate their activities. Students prefer to use online transportation rather than public transportation because the quality and services provided by online transportation are far better than public transportation [5]. One of the best and best-selling online transportation services in Indonesia in 2021 is Gojek and Grab (InfoJek).

Gojek was founded in 2010, pioneered by PT. Indonesian GoJek. Gojek is a social-minded technology company that aims to improve the welfare of workers in various informal sectors in Indonesia. Gojek's activities are based on three main values, namely speed, innovation and social impact [6]. Until now, there are many types of services offered by Gojek, such as Gofood, Gosend, Goride, Gocar, and other features. Meanwhile Grab is a company from Malaysia which was founded by Anthony Tan in 2012 and entered Indonesia in 2014 [7]. Grab has the same services as Gojek, namely GrabBike, GrabCar, GrabFood, and so on.

The similarity in terms of meeting customer needs makes Gojek and Grab compete with each other, by trying to increase their respective advantages in order to attract customers. Business competition is a natural thing in the industrial world. Every company is competing to offer various kinds of advantages and benefits of products that are marketed with the aim of making a profit. Service quality at transportation companies such as Go-Jek greatly determines customer satisfaction [8]. Facing this competition, companies need a strategy marketing. Marketing strategy serves as a crucial avenue for attaining a sustainable competitive advantage, applicable to both goods and services-producing companies [9]. To thrive and compete effectively, companies must adeptly identify and implement the right marketing strategies. Understanding and anticipating competitors' actions are imperative for companies to formulate optimal marketing approaches. Game theory emerges as a valuable method for analyzing the marketing strategies of two competing companies, offering insights into the dynamics and interactions between competitors in the marketplace.

Game theory is a mathematical framework employed to analyze, formulate, and study political or competitive scenarios that involve two or more parties, with the aim of achieving an optimal decision for each participant [2]. It originated to scrutinize the

decision-making dynamics in diverse competitive situations where multiple interests are at play. Within the realm of game theory, participants employ mathematical techniques and logical reasoning to discern and implement the most effective strategies for decision-making, ultimately seeking success in the competition [10].

The success of a company can be seen based on the company's expertise in controlling its marketing strategy [2]. The marketing concept encompasses a toolkit whose characteristics can be managed through the marketing mix. The marketing mix constitutes a blend of variables or activities that forms the core of the marketing system. These variables, strategically employed by a company, are designed to impact consumer responses within its target market [11].

The services marketing mix has seven elements (7P), namely products, price, promotions, place, people, process, and physical evidence. Various studies on the application of game theory have been carried out, namely an analysis of the competition strategy between online transportation services Gojek and Grab using game theory in a case study: students on the island of Java. The results showed that the game data between Go Ride and Grab Bike obtained an optimal game value of 6 with a pure strategy. The best optimal strategy taken by both Gojek and Grab online transportation services is to increase the promotion strategy for each transportation service [12].

Furthermore, research on the implementation of game theory in the marketing strategy of laptop products at undergraduate students with the results obtained showed that the brand of Acer and Asus laptop game data obtained an optimal value of 11 where the game was solved with a mixed strategy. Acer laptops are superior in battery and price, while Asus laptops are superior in design strategy and hard disk strategy [7].

This research was conducted to find out what strategy is suitable for Gojek and Grab by using the 7P concept of the marketing mix that has been developed to find out the optimal game value and superior strategy of both Gojek and Grab online transportation services using game theory based on the perspective of FMIPA-USK students in choosing services online transportation.

2 Methodology

2.1 Scope of the research

Data collection in this research was carried out at the Faculty of Mathematics and Natural Sciences (FMIPA) Universitas Syiah Kuala (USK). This research uses primary data obtained directly from respondents using measuring instruments in the form of questionnaires. The data collection process was carried out using a Google form which was given to active FMIPA USK students in the even semester of the 2020/2021 academic year as respondents provided, they knew or had used the online transportation services Gojek and Grab. Respondents were asked to provide an assessment of their perception of the strategies used by Gojek or Grab service companies to attract customers.

This questionnaire is built on the concept of 7P marketing mix that has been developed such as products (applications and practical), price (cost-effective and promos), promotions (advertising), place (fleet availability), people (safety and comfort), process

(service), and physical evidence (completeness of facilities). The marketing concept is used as a research attribute, where the Gojek strategy player attribute is denoted by X and the Grab strategy player attribute is denoted by Y. The attributes used can be seen in Table 1.

Based on these attributes, respondents were given statements regarding the strategies used by Gojek and Grab and asked to choose which strategy would be considered from one of the Gojek and Grab transportation services. The preparation of the research quetionnaire questions used can be seen in Table 1.

Table 1. Attributes of the research questionnaire

Atribute	Players	
	Gojek	**Grab**
Services	X_1	Y_1
Practical	X_2	Y_2
Cost-effective	X_3	Y_3
Safety	X_4	Y_4
Convenience	X_5	Y_5
Promo	X_6	Y_6
Advertisement	X_7	Y_7
Application	X_8	Y_8
Fleet availability	X_9	Y_9
Completeness of facilities	X_{10}	Y_{10}

2.2 Sampling Technique

The sampling technique used in this study is stratified random sampling by taking into account the strata in the population. The population of this study consisted of active students of FMIPA USK even semester of the 2020/2021 academic year as many as 2187 students using an error rate of 5% and using the Slovin formula, the number of samples used in this study was 338 students.

Determining the number of each sample to be taken for each department uses a proportional random sampling technique with a proportional allocation calculation. Then the number of sample members based on the majors in FMIPA USK can be seen in Table 2.

Table 2. Sample size of each department of FMIPA USK

No	Department	Number of students	Sample size
1	Biology	244	43
2	Pharmacy	214	38
3	Physics	195	36
4	Informatics	312	64
5	Chemistry	240	40
6	Mathematics	252	46
7	Statistics	245	42
8	Informatics Management	145	22
9	Electronics Engineering	43	7
	Total	**2187**	**338**

3 Results and Discussion

3.1 Research Instrument Testing

The questionnaire instrument test carried out in this research was a validity and reliability test. Based on the results of validity testing, it was found that all questions used in the research instrument were declared valid. This can be seen from the correlation value > 0.3061, in other words the 10 question items can be used to measure or find out the perspective of USK FMIPA students in choosing online transportation services based on marketing strategies.

The reliability test aims to determine the consistency of question items. With the help of Rstudio software, the results of the calculation of the reliability test of the instrument are obtained. This is indicated by the Cronbach's Alpha value obtained > 0.6, in other words the data produced in this study is consistent and reliable.

3.2 Game Theory Data Analysis

The initial step of data processing in game theory is to form a game matrix. To get optimal results in this game, two kinds of strategies can be used, namely pure strategy and mixed strategy. In the realm of game theory, participants employ mathematical techniques and logical reasoning to determine the optimal strategy in decision-making, aiming to secure victory in the competition. The advantage of game theory is that game theory can calculate the steps that will be taken by other players (rivals) [13]. The formation of the payoff matrix is used for each player with its competitors, in this study the players are Gojek and Grab. Gojek as a line player and Grab as a column player, so

that the recapitulation data from the questionnaire is obtained as follows and refers to Table 3.

Table 3. Data summary table

	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
X1	134 / 204	142 / 196	219 / 119	181 / 157	197 / 142	205 / 133	129 / 209	113 / 225	146 / 192	136 / 202
X2	167 / 171	149 / 189	228 / 110	217 / 121	215 / 123	222 / 116	134 / 204	113 / 225	149 / 190	147 / 191
X3	93 / 245	99 / 239	119 / 219	133 / 205	130 / 208	161 / 177	106 / 232	92 / 216	137 / 201	102 / 226
X4	124 / 214	114 / 224	180 / 158	133 / 205	138 / 205	188 / 150	104 / 234	100 / 238	133 / 205	117 / 221
X5	97 / 241	99 / 239	131 / 207	134 / 204	130 / 208	113 / 225	109 / 229	89 / 249	117 / 221	106 / 232
X6	130 / 208	125 / 213	204 / 134	186 / 152	143 / 195	216 / 122	121 / 217	86 / 244	147 / 191	130 / 208
X7	236 / 102	244 / 94	238 / 100	247 / 91	237 / 101	235 / 103	224 / 114	227 / 111	147 / 191	234 / 104
X8	195 / 143	/ 1198	222 / 116	225 / 113	221 / 117	221 / 117	184 / 154	142 / 197	117 / 221	191 / 147
X9	184 / 154	198 / 140	220 / 118	224 / 114	207 / 131	216 / 122	144 / 194	141 / 197	115 / 223	167 / 171
X10	158 / 166	180 / 158	211 / 127	200 / 138	197 / 141	212 / 126	137 / 201	127 / 211	99 / 239	129 / 209

The acquisition value is the row player value minus the column player value. The Gojek and Grab game acquisition value matrix can be seen in Table 4 below.

Table 4. Matrix of Gojek and Grab game acquisition value

P_1 \ P_2	Y_1	Y_2	Y_3	Y_4	Y_5	Y_6	Y_7	Y_8	Y_9	Y_{10}
X_1	70	54	-100	-24	-54	-72	80	112	46	66
X_2	4	40	-118	-96	-92	-106	70	112	41	44
X_3	152	140	100	72	78	16	126	164	64	114
X_4	90	110	-22	72	72	-38	130	138	72	104
X_5	144	140	76	70	78	112	120	160	104	126
X_6	78	88	-70	-34	52	-94	96	116	44	78
X_7	-134	-150	-138	-156	-136	-132	-110	-116	44	-130
X_8	-52	-58	-106	-112	-104	-104	-30	56	104	-44
X_9	-30	-58	-102	-110	-76	-94	50	56	108	4
X_{10}	-6	-22	-84	-62	-56	-86	64	84	140	80

Next, from this matrix we will look for the maximum value for the row players and the minimax value for the column players which can be seen in Tabel 5

Table 5. Minimax and maximum values

P2 / P1	Y_1	Y_2	Y_3	Y_4	Y_5	Y_6	Y_7	Y_8	Y_9	Y_{10}	Min
X_1	70	54	-100	-24	-54	-72	80	112	46	66	-100
X_2	4	40	-118	-96	-92	-106	70	112	41	44	-118
X_3	152	140	100	72	78	16	126	164	64	114	16
X_4	90	110	-22	72	72	-38	130	138	72	104	-38
X_5	144	140	76	70	78	112	120	160	104	126	70
X_6	78	88	-70	-34	52	-94	96	116	44	78	-94
X_7	-134	-150	-138	-156	-136	-132	-110	-116	44	-130	-156
X_8	-52	-58	-106	-112	-104	-104	-30	56	104	-44	-112
X_9	-30	-58	-102	-110	-76	-94	50	56	108	4	-110
X_{10}	-6	-22	-84	-62	-56	-86	64	84	140	80	-86
Max.	152	140	100	72	78	112	130	164	140	126	

The game will be tested first by using a pure strategy by finding the maximum value of row players and the minimum value of column players. Game theory focuses on determining optimal strategy, where each player makes decisions rationally and struggles to read the strategy that will be used by the opponent [14].Based on Table 6., the minimum value for the column players is 70, which is not the same as the maximum value for the row players, namely 72. This means that the game does not have a saddle point so it cannot be solved using pure strategy. Then the next step is to find a saddle point with dominance rules. By using the domination rule, it is hoped that the matrix can be reduced, so that it is hoped that the saddle point can be found.

A strategy in the game matrix is said to be dominant over other strategies if the value of a player's strategy is better than other strategies [15]. Line players use the maximin criterion, which means maximizing the minimum profit. Column players use the minimax criteria, which means minimizing the maximum loss. If the player's row removed from the matrix is the dominated row, conversely for the player the column removed is the dominating column.

Using the rule of domination in the hope that a saddle point can be found then, for players the strategy line X_1, X_2, X_6, X_7, X_8, X_9, is dominated by strategy X_5.

Table 6. Reduced game matrix 1 (domination 1)

P1 \ P2	Y_1	Y_2	Y_3	Y_4	Y_5	Y_6	Y_7	Y_8	Y_9	Y_{10}	Min
X_3	152	140	100	72	78	16	126	164	64	114	16
X_4	90	110	-22	72	72	-38	130	138	72	104	-38
X_5	144	140	76	70	78	112	120	160	104	126	70
X_{10}	-6	-22	-84	-62	-56	-86	64	84	140	80	-86
Max	152	140	100	72	78	112	130	164	140	126	

Table 6 shows that the maximin value is still not the same as the minimax value, meaning that the game is not optimal because it does not yet have a saddle point. By looking at the remaining rows, it can be seen that for the column players, the strategies Y_1, Y_2,Y_5,Y_7,Y_8,Y_9, and Y_{10} dominate the strategy Y_4 So the following table is obtained.

Table 7. Reduced game matrix II (domination 2)

P1 \ P2	Y_3	Y_4	Y_6	Min
X_3	100	72	16	16
X_4	-22	72	-38	-38
X_5	76	70	112	70
X_{10}	-84	-62	-86	-86
Max	100	72	112	

Table 7 also still shows that the maximin and minimax values are not the same and continue again by eliminating rows and columns with line players eliminating strategies X_4 dan X_{10} which are rows dominated by strategy $X_3$and strategy Y_3dominate strategy Y_4. As in Table 9 below:

Table 8. Reduced game matrix III (dominance 3)

P1 \ P2	Y_4	Y_6	Min
X_3	72	16	16
X_5	70	112	70
Max	72	112	

After carrying out the domination rules, the maximum value is 70 while the minimum value is 72, in other words, the maximin value is still not the same as the minimax

value, meaning that this game cannot be played with a pure strategy. Then the balance point will be sought using a mixed strategy, in this case using a linear program with the simplex method.

In order to ensure that the value of game (V) is positive, all elements of the matrix are added with a value of k. k is the smallest value contained in a matrix element which is then converted into a positive number. All elements of the matrix are added with the value k = 156, because -156 is the smallest number contained in the game matrix. Once added, the game value results change to the following table.

Table 9. Game modification gain matrix

P2 / P1	Y_1	Y_2	Y_3	Y_4	Y_5	Y_6	Y_7	Y_8	Y_9	Y_{10}
X_1	226	210	56	132	102	84	236	268	202	222
X_2	160	196	38	60	64	50	226	268	197	200
X_3	308	296	256	228	234	172	282	320	220	270
X_4	246	266	134	228	228	118	286	294	228	260
X_5	300	296	232	226	234	268	276	316	260	282
X_6	234	244	86	122	208	62	252	272	200	234
X_7	22	6	18	0	20	24	46	40	200	26
X_8	104	98	50	44	52	52	126	212	260	112
X_9	126	98	54	46	80	62	206	212	264	160
X_{10}	150	134	72	94	100	70	220	240	296	236

Is a maximizing player so his aim is to maximize the value of V, or the same as minimizing 1/V. Therefore, it can be formulated in the form of a linear program for line players as equation (1).

$$\text{Minimize } Z=\frac{1}{V}=\sum_{i=1}^{10} X_i=X_1+X_2+X_3+X_4+X_5+X_6+X_7+X_8+X_9+X_{10} \quad (1)$$

with limitations:

$$226X_1+160X_2+308X_3+246X_4+300X_5+234X_6+22X_7+104X_8+126X_9+150X_{10} \geq 1$$
$$210X_1+196X_2+296X_3+266X_4+296X_5+244X_6+6X_7+98X_8+98X_9+134X_{10} \geq 1$$
$$56X_1+38X_2+256X_3+134X_4+232X_5+86X_6+18X_7+50X_8+54X_9+72X_{10} \geq 1$$
$$132X_1+60X_2+228X_3+228X_4+226X_5+122X_6+0X_7+44X_8+46X_9+94 \geq 1$$
$$102X_1+64X_2+234X_3+228X_4+234X_5+208X_6+20X_7+52X_8+80X_9+100X_{10} \geq 1$$
$$84X_1+50X_2+172X_3+118X_4+268X_5+62X_6+24X_7+52X_8+62X_9+70X_{10} \geq 1$$
$$236X_1+226X_2+282+286X_4+276X_5+252X_6+46X_7+126X_8+206X_9+220X_{10} \geq 1$$
$$268X_1+268X_2+320X_3+294X_4+316X_5+272X_6+40X_7+212X_8+212X_9+240X_{10} \geq 1$$
$$202X_1+197X_2+220X_3+228X_4+260X_5+200X_6+200X_7+260X_8+264X_9+296X_{10} \geq 1$$
$$222X_1+200X_2+270X_3+260X_4+282X_5+234X_6+26X_7+112X_8+160X_9+236X_{10} \geq 1$$

This problem was then resolved using the POM QM 4.0 program with the following table.

Table 10. Game modification earned value matrix

Minimize	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}		RHS
	1	1	1	1	1	1	1	1	1	1		
Services	226	160	308	246	300	234	22	104	126	150	≥	1
Practical	210	196	296	266	296	244	6	98	98	134	≥	1
Cost-effective	56	38	256	134	232	86	18	50	54	72	≥	1
Safety	132	60	228	228	226	122	0	44	46	94	≥	1
Convenience	102	64	234	228	234	208	20	52	80	100	≥	1
Promo	84	50	172	118	268	62	24	52	62	70	≥	1
Advertisement	236	226	282	286	276	252	46	126	206	220	≥	1
Application	268	268	320	294	316	272	40	212	212	240	≥	1
Fleet availability	202	197	220	228	260	200	200	260	264	296	≥	1
Completeness of facilities	222	200	270	260	282	234	26	112	160	236	≥	1

After being operated, the optimal results are obtained as follows and the output results of the completion can be seen in Table 11.

Table 11. Optimal game results

Minimize	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}		RHS	Dual
	1	1	1	1	1	1	1	1	1	1			
Services	226	160	308	246	300	234	22	104	126	150	≥	1	0
Practical	210	196	296	266	296	244	6	98	98	134	≥	1	0
Cost-effective	56	38	256	134	232	86	18	50	54	72	≥	1	0
Safety	132	60	228	228	226	122	0	44	46	94	≥	1	0.0043
Convenience	102	64	234	228	234	208	20	52	80	100	≥	1	0
Promo	84	50	172	118	268	62	24	52	62	70	≥	1	0.0001
Advertisement	236	226	282	286	276	252	46	126	206	220	≥	1	0
Application	268	268	320	294	316	272	40	212	212	240	≥	1	0
Fleet availability	202	197	220	228	260	200	200	260	264	296	≥	1	0
Completeness of facilities	222	200	270	260	282	234	26	112	160	236	≥	1	0
Soltion	0	0	0.0019	0	0.0025	0	0	0	0	0		0,0044	

Based on Table 11, the optimal solution for line players is obtained, namely $X_3$is 0.0019 and $X_5$is 0.0025, while for X_1, X_2, X_4, X_6, X_7, X_8, X_9, dan X_{10}, equal to 0. So that with the optimal solution value, the objective function value (Z) is 0.0044 and race against Equation (1), the game value (V) is obtained as follows in equation (2).

Because $Z = \frac{1}{V}$

So $V = \frac{1}{Z} = \frac{1}{0{,}0044} = 227{,}27 \approx 227$

$X_i \times V = 0$ for $i = 1, 2, 4, 6, 7, 8, 9, 10$

$X_3 = X_3 \times V = 0{,}0019 \times 227 = 0{,}431 = 43{,}1\%$

$X_5 = X_5 \times V = 0{,}0025 \times 227 = 0{,}567 = 56{,}7\%$ (2)

Because the elements of the acquisition matrix for the game have been added with K = 156, the value of the game is "V = 227-156 = 71. So, using a mixed strategy, the probability values for the cost-effective strategy and convenience strategy are respectively 43.1% and 56.7%, so that the optimal strategy for Gojek transportation services is obtained, namely the X_3 strategy (Cost Saving) and the X_5 strategy (Convenience) with a game value of 71.

4 Conclusion

In the mixed strategy, both online transportation service providers, Gojek and Grab, converge on the same saddle point value, which is 71. This saddle point value represents the optimal game value for both players. Consequently, it indicates the probability associated with the optimal marketing mix strategy for both Gojek and Grab. These probabilities are derived based on the perspective of students from the Faculty of Mathematics and Natural Sciences (FMIPA) at Universitas Syiah Kuala (USK) in the even semester of the 2020/2021 academic year, who are users of this online transportation service.

The optimal strategy for Gojek online transportation services according to the perspective of FMIPA-USK students is a cost-effective strategy (X_3) and a convenience strategy (X_5), with the probabilities obtained for carrying out the strategy cost-effective by 43.1% and convenience strategy by 56.7%. As for Grab's online transportation service, the optimal strategy from the perspective of FMIPA-USK students is a security strategy (X_4) with a probability of doing this strategy of 97.6% and a promo strategy (X_6) by 2.2%.

References

1. A. W. Kurniati, "Komunikasi Pemasaran Transportasi Online NguberJEK," *Jurnal Komunikasi dan Kajian Media,* vol. 1, no. 1, pp. 70-76, 2017.

2. J. Hendri, Riset Operasional, Jakarta: Universitas Gunanda., 2009.
3. W. Windasari and T. Zakiyah, "Analisis Game Theory pada Strategi Bersaing Grab dan Go-Jek di Kabupaten Kebumen," in *PRISMA, Prosiding Seminar Nasional Matematika*, 2020.
4. MenHub, "Menhub: Transportasi Sudah Menjadi Kebutuhan Dasar bagi Masyarakat.," 2021. [Online]. Available: http://dephub.go.id/post/read/menhub-transportasi-sudah-menjadi-kebutuhan-dasar-masyarakat. [Accessed July 2021].
5. Go-Jek, "Tentang Go-Jek.," Go-Jek, 2017. [Online]. Available: https://d24q9vurymtq75.cloudfront.net/about/. . [Accessed 17 July 2021].
6. Grab, "Story Grab," Grab, [Online]. Available: https://www.grab.com/id/brand-story/. . [Accessed 17 July 2021].
7. A. R. Sihombing, "Implementasi Teori Permainan dalam Strategi Pemasaran Produk Laptop (Studi Kasus Mahasiswa FMIPA USU)," Universitas Sumatera Utara, Medan, 2017.
8. Amiruddin, Nazaruddin, T. M. Jamil and Y. H. Andika, "The effect of service quality toward customer satisfaction of go-jek online transportation: A case study of students at syiah kuala university, Indonesia," in *Journal of Physics: Conference Series*, Banda Aceh, 2020.
9. D. H. Wibowo, Z. Arifin and Sunarti., "Strategi dan Program Pemasaran," *Jurnal Administrasi Bisnis (JAB),* vol. 29, no. 1, p. 59–66., 2015.
10. A. Saifuddin, N. K. T. Tastrawati and K. Sari, "Penerapan Konsep Teori Permainan (Game Theory) dalam Pemilihan Strategi Kampanye Politik (Studi Kasus : Strategi Pemenangan Pemilukada DKI Jakarta Tahun 2018," *E-Jurnal Matematika,* vol. 7, no. 2, pp. 173-178, 2018.
11. M. Anggriani, "Pengaruh Bauran Pemasaran 7P terhadap Minat Nasabah dalam Memilih Pt. Asuransi Takaful Keluarga Palembang," Universitas Islam Negeri Raden Fatah, Palembang, 2017.
12. Y. Budiana and F. N. Khasanah, "Analisis Strategi Kompetisi Antara Jasa Transportasi Online Gojek dan Grab dengan Menggunakan Game Theory (Studi Kasus: Mahasiswa di Pulau Jawa)," *Jurnal Mitra Manajemen (JMM Online),* vol. 4, no. 1, pp. 16-27, 2020.
13. A. Saifuddin, N. K. T. Tastrawati and K. Sari, "Penerapan Konsep Teori Permainan (Game Theory) dalam Pemilihan Strategi Kampanye Politik Studi Kasus : Strategi Pemenangan Pemilukada DKI Jakarta Tahun 2018," *E- Jurnal Matematika,* vol. 7, no. 2, pp. 173-178, 2018.
14. J. Brickley, C. Smith and J. Zimmerman, "An Introduction to Game Theory and Business Strategy," *Journal of Applied Corporate Finance,* vol. 13, no. 2, pp. 84-98, 2000.
15. A. A. Rufai, B. A. Martins and A. A. Adebanwa, "Review of Strategies in Games Theory and Its Application In Decision Making," *IOSR Journal of Economics and Finance (IOSR-JEF),* vol. 12, no. 1, pp. 06-22, 2021.