

# Analyzing Conflict Resolution between Online and Conventional Transportation Using Graph Model for Conflict Resolution

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**Abstract**—The purpose of this paper is to analyze the conflict between online transportation companies and conventional transportation in Indonesia. This conflict arose after the opening of several online transportation service companies (Uber, Grab and Go-Jek) in Indonesia. Parties involved in this conflict are drivers of online transportation services, drivers of conventional transportations services and Indonesian government (Ministry of Transportation). This research employs a qualitative research method, and the data was collected using a literature review and interviews. This data was analyzed with the Graph Model for Conflict Resolution (GMCR) and validated through interviewed by the parties involved in this conflict. Two stages of conflict analyzed in this research: frame I and frame II. The first is before the government issued the Ministry of Transportation regulation num. 108 of 2017, the second is after that. We found that there are 20 feasible scenarios for the frame I and 26 feasible scenarios for frame II. With a lot of business disruptions in this internet era, Indonesian Government can use this research as a reference for in resolving the similar conflict caused by the introduction of a new business model that threatens the stability of the conventional one.

**Keywords**—graph model; conflict; transportation

## I. INTRODUCTION

The presence of online transportation service has created several oppositions worldwide, especially from conventional transportation services, such as taxis [1,2], and public transit [3]. Online transportation services here refer to transportation services that connect community drivers – people who drive private cars instead of commercial vehicles - with passengers via mobile devices and applications, or in an academic term called ridesourcing [4]. Indonesia also had embraced these platforms, namely Go-Jek, that dominates its market, Grab, and up to earlier this year, Uber [5] and faced with the same situation, where conventional transportation services (i.e., taxis, buses, and city transport) request the government to close the online transportation service companies and even use violence as a form of protest.

Most research on ride sourcing focused on developing a model to optimize the ride-sharing match [6,7] and analyze its impact [8,9]. There also research that studies its impact on

society and government policy, such as Watanabe et al. [3], Geissinger et al. [10], and Flores and Rayle [11]. However, there is a limited number of research tried to analyze the dynamic of conflict created by this sharing-technology.

Therefore, this research tried to analyze how the conflict evolved using GMCR to understand what kind of move that should be taken by the decision makers involved in this conflict. We collect data from the literature (e.g., media news) and interview with the decision makers. The goal of this paper is not to recommend this conflict, but rather to analyze the movement of decision makers involved.

### A. Conflict Background

Conflicts between online transportation services and conventional transportation services started in 2016, where conventional transportation drivers staged a demonstration because they felt their incomes dropped due to the presence of online transportation services. They demanded that the closing of online transportation services for its detrimental effect to them. The protests by conventional transport drivers occurred in several large cities such as Jakarta, Palembang, Malang, Balikpapan, Batam, Yogyakarta, Medan and almost all cities where online transportation services operate. Meanwhile, there are a lot of pressures to the government to make a regulation to legalize online transportation services existence. As an effort to eliminate those strikes, the government then issued the Minister of Transportation Regulation No. 32 of 2016. However, this regulation was considered discriminatory against conventional transportation services and created horizontal conflict between conventional transport drivers and online transport in the road.

Throughout the year 2017, this resistance to online transport was worsening, involving violence, extortion, and territorial bans. Along with their previous demand, conventional transportation drivers also asked the government to revoke Minister of Transportation Regulation No. 32 of 2016. To deal with the intimidation, violence and territorial bans, online transportation drivers started to remove their company attributes (i.e., jacket and helmet) when taking their passenger.

October 24<sup>th</sup>, 2017, the government then issued Minister of Transportation Regulation No. 108 of 2017, which should be effective from November 1<sup>st</sup>, 2017. In response to this regulation, online transportation services started conducting protest and demonstration, because this regulation has several clauses that unfavorable for them (e.g., incorporated vehicle registration certificate). They requested the government to revoke this regulation and made a new regulation that accommodating their needs. Along with that request, online transportation drivers also demanded the government to take serious action over acts of violence and intimidation by the taxis and city transport drivers.

After a series of protests and demonstrations, on March 28<sup>th</sup>, 2018, Aliando (National Alliance of Online Drivers) stated that the government nullified minister of Transportation Regulation No. 108 of 2017. While, this statement calmed down online transport drivers, from an interview with the Minister of Transportation's public relation officer, the government never revoked the regulation. It still effective until today. However, since there is still no real action from the government for not abiding by this regulation, most online transport drivers still didn't comply with it.

## II. METHOD

### A. Graph Model for Conflict Resolution (GMCR)

The Graph Model for Conflict Resolution derive from Conflict Analysis, as an improvement. In GMCR, graphs become the key component which defined as a Decision Maker's available moves. The directed graph in GMCR encoded one step of a Decision Maker's move.

The Graph Model for Conflict Resolution is a methodology to model and analyze strategic conflict. Its aim to make the process become simple, flexible, and involve minimal information while producing a good understanding of how decision makers should move and encourage them to be creative [2].

As Describe in Kim et al. [2], GMCR has four components, as follows:

- $N$  is the set of decision-makers, where  $2 \leq n = |N| < \infty$ . It written as  $N = \{1, 2, \dots, n\}$ .
- $S$  is the set of (distinguishable) states, where  $2 \leq m = |S| < \infty$ . One particular state,  $s_0$ , is designated as the status quo state.
- For each  $i \in N$ ,  $G_i$  is the Decision Maker's directed graph, where  $G_i = (S, A_i)$ .  $A_i$  is the arc set, where  $A_i \subseteq S \times S$ . The arcs,  $A_i$ , are the state transitions controlled by  $DM_i$ .
- For each  $i \in N$ , a complete binary relation  $\succsim_i$  on  $S$  that specifies  $DM_i$ 's preference over  $S$ . If  $s, t \in S$ , then  $s \succsim_i t$  means that  $DM_i$  prefers  $s$  to  $t$ , or is indifferent between  $s$  and  $t$ . Following well-established conventions, we say that  $i$  strictly prefers  $s$  to  $t$ , written  $s \succ_i t$ , if and only if  $s \succsim_i t$  but  $\neg[t \succsim_i s]$  (i.e., it is not the case that  $t \succsim_i s$ ). Also, we say that  $i$  is indifferent between  $s$  and  $t$ , written  $s \sim_i t$ , if and only if  $s \succsim_i t$  and  $t \succsim_i s$ .

## III. RESULT AND DISCUSSION

Based on how the conflict developed, there are three frames that we will model in this research. The first frame is before the government issued Minister of Transportation Regulation No. 108 of 2017. From this regulation was issued until Aliando stated that government revoked the regulation as the second frame and the last frame is the period after that.

### A. Decision Makers (DMs)

In this conflict, there are three decision makers involved: online transportation services, conventional transportation services, and the government (See figure 1). Online transportation services are defined as the drivers of online transportation companies (e.g., Go-Jek, Grab), while conventional transportation services are drivers of the city, transports, buses, and taxis (which are under an organization named Organda). The government here is represented by the ministry of transportation. These decision makers are involved in all three frames analyzed in this research.

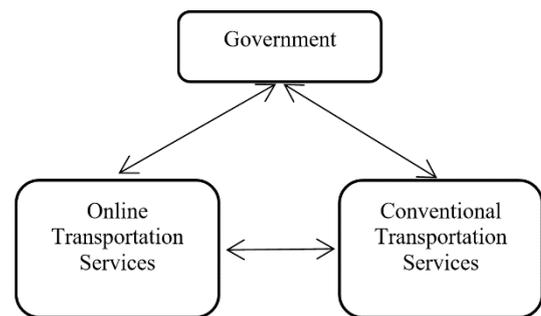


Fig. 1. Decision makers.

We will discuss the rest of GMCR steps in this paper per frame. Therefore, the frame I will be modeled and discussed first, followed by frame II and frame III.

### B. Frame I

Based on the secondary and primary data obtained, options for each decision maker in the frame I can be found in table 1. From these five options available, we developed scenarios, and scenarios that impossible to happen is removed. Those impossible occurrences are scenarios where conventional transport drivers conducted intimidation and violence against online transport and held mass demonstrations and strikes when online transportation services stop operating. Therefore, twenty feasible states/scenarios then processed for the next steps (see table 2). Status quo in this frame is scenario 3, where conventional transportation services conduct intimidation and violence against online transports, held mass demonstrations and strikes; conventional transportation services are in operation, and government have made a regulation to legalize online transportation services and did not revoke regulation No. 32 of 2016.

TABLE I. OPTIONS FOR EACH DMS IN FRAME I

Code	Option
<b>Conventional Transportation Services</b>	
K1	Conduct intimidation and violence against online transport
K2	Held mass demonstrations and strikes
<b>Online Transportation Services</b>	
O1	Operating
<b>Government</b>	
P1	Revoke regulations Num. 32 of 2016
P2	Make regulation to legalize online transportation services

TABLE II. FEASIBLE STATE FOR FRAME I

Code	1	2	3	4	5	6	7	8	9	10
<b>Conventional Transportation Service</b>										
C1	Y	Y	Y	Y	Y	Y	Y	Y	N	N
C2	Y	Y	Y	Y	N	N	N	N	Y	Y
<b>Online Transportation Service</b>										
O1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
<b>Government</b>										
G1	Y	Y	N	N	Y	Y	N	N	Y	Y
G2	Y	N	Y	N	Y	N	Y	N	Y	N
<b>Code 11 12 13 14 15 16 17 18 19 20</b>										
<b>Conventional Transportation Service</b>										
C1	N	N	N	N	N	N	N	N	N	N
C2	Y	Y	N	N	N	N	N	N	N	N
<b>Online Transportation Service</b>										
O1	Y	Y	Y	Y	Y	Y	N	N	N	N
<b>Government</b>										
G1	N	N	Y	Y	N	N	Y	Y	N	N
G2	Y	N	Y	N	Y	N	Y	N	Y	N

The preference for each decision makers in this frame is as follow:

- Conventional transportation services:
  - $17 > 9 > 13 > 1 > 5 > 18 > 19 > 10 > 14 > 11 > 15 > 2 > 6 > 3 > 7 > 20 > 12 > 16 > 4 > 8$
- Online transportation services:
  - $13 > 5 > 9 > 1 > 15 > 7 > 11 > 3 > 14 > 6 > 10 > 2 > 16 > 8 > 12 > 4 > 17 \sim 19 > 18 \sim 20$
- Government:
  - $9 > 1 > 13 \sim 17 > 5 > 11 > 3 > 15 \sim 19 > 10 > 7 > 2 > 14 \sim 18 > 6 > 12 > 4 > 16 \sim 20 > 8$

Figure 2 displays the graph model for this frame. This figure means, to move from the status quo scenario (scenario 3) to a better scenario, Government needs to move to scenario one by revoking the regulation num. 32 of 2016. Conventional transportation services also can have a better scenario by stop conducting intimidation and violence to online transport drivers.

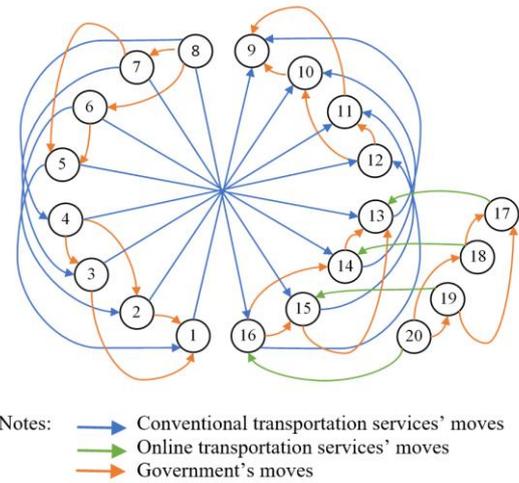


Fig. 2. Graph model for conflict in frame I.

From figure 2, we can see that scenario 3, the status quo was unstable, where two decision-makers were willing to move from their current position to have a better scenario: conventional transportation services and government. The equilibrium, in this case, is scenario 9. However, the government chooses to moves differently, by creating a new option, that brought this conflict into another frame, frame II in this research, when it issued the Ministry of Transportation regulation num. 108 of 2017. Many decision-makers have made this kind of move as shown in Putra and Alamanda [12], Putri and Alamanda [13], Sari [14] and Yu and Wang [15]. These cases show that a decision-maker can move differently from the available options, and caused the conflict to enter another phase of the conflict.

C. Frame II

This frame started when the government moved and issued ministry of transportation regulation num. 108 of 2017. Since there are a lot of new requirements that need to be fulfilled by the online transportation services, the drivers started to protest and held a demonstration. However, while conventional transport drivers perceived this regulation as beneficial to them, they still conduct intimidation and violence, especially in “red” areas. Table 3 below shows the options for this frame.

TABLE III. OPTIONS FOR EACH DMS IN FRAME II

Code	Option
<b>Conventional Transportation Services</b>	
K1	Conduct intimidation and violence against online transport
<b>Online Transportation Services</b>	
O1	Held mass demonstrations
O2	Operating
<b>Government</b>	
P1	Act upon the violence and intimidation faced by online transport drivers
P2	Revoke regulation no. 108 of 2017
P3	Appeals for online transports to stop operating temporarily

Table 4 shows the preference of decision-makers in this frame. In this table, we can see that there are 26 feasible

scenarios, which came from 64 combinations of possible outcomes. Removed scenarios are as follow:

- When online transportation services stop operating, conventional transport drivers won't be able to conduct any intimidation and violence against them. Thus, there won't be any necessary appeals for online transport to stop operation taken by the government.
- The government won't be able to act upon the violence and intimidation if there are no intimidation and violence done by the conventional transport drivers
- The condition of conventional transportation driver did not conduct any intimidation and violence against online transport, government revokes the regulation no

108 of 2017 and appeals for online transport to stop operating, whereas online transportation services held mass demonstration is unlikely to happen.

In this frame, scenario 7 is the status quo, where conventional transport drivers were conducting intimidation and violence against online transport; online transportation services held mass demonstrations and in operation; and government act upon the violence and intimidation faced by online transport drivers, did not revoke regulation number 108 of 2017 and appeals for online transports to stop operating temporarily.

TABLE IV. FEASIBLE STATE FOR FRAME II

Code	1	2	3	4	5	6	7	8	9	10	11	12	13
<i>Conventional Transportation Service</i>													
C1	Y	Y	Y	N	Y	N	Y	Y	Y	N	Y	N	Y
<i>Online Transportation Service</i>													
O1	Y	N	Y	Y	N	N	Y	N	Y	Y	N	N	Y
O2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
<i>Government</i>													
G1	Y	Y	N	N	N	N	Y	Y	N	N	N	N	Y
G2	Y	Y	Y	Y	Y	Y	N	N	N	N	N	N	Y
G3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N
<i>Code</i>													
	14	15	16	17	18	19	20	21	22	23	24	25	26
<i>Conventional Transportation Service</i>													
C1	Y	Y	Y	N	N	Y	Y	Y	N	Y	N	N	N
<i>Online Transportation Service</i>													
O1	N	Y	N	N	N	Y	N	Y	Y	N	N	Y	N
O2	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	N	N
<i>Government</i>													
G1	Y	N	N	N	N	Y	Y	N	N	N	N	N	N
G2	Y	Y	Y	Y	Y	N	N	N	N	N	N	N	N
G3	N	N	N	N	N	N	N	N	N	N	N	N	N

In this frame, the scenario preferences for each decision maker are as follows:

- Conventional transportation services:  
 $26 \succ 8 \succ 20 \succ 18 \succ 25 \succ 12 \succ 24 \succ 2 \succ 14 \succ 7 \succ 19 \succ 11 \succ 23 \succ 6 \succ 17 \succ 10 \succ 22 \succ 1 \succ 13 \succ 5 \succ 16 \succ 9 \succ 21 \succ 4 \succ 3 \succ 15$
- Online transportation services:  
 $13 \succ 1 \succ 14 \succ 2 \succ 15 \succ 4 \succ 3 \succ 17 \succ 16 \succ 6 \succ 5 \succ 19 \succ 7 \succ 20 \succ 8 \succ 22 \succ 21 \succ 10 \succ 18 \succ 9 \succ 24 \succ 23 \succ 12 \succ 11 \succ 25 \succ 26$
- Government:  
 $8 \sim 20 \succ 7 \sim 19 \succ 2 \sim 14 \succ 17 \sim 12 \succ 6 \sim 24 \succ 26 \succ 1 \sim 13 \succ 11 \sim 23 \succ 10 \sim 22 \succ 25 \succ 9 \sim 21 \succ 18 \succ 5 \sim 16 \succ 4 \succ 3 \sim 15$

Figure 3 demonstrates the movements of decision-makers in this frame. In this graph, we couldn't find an equilibrium because of the indecisiveness of the government, where the government is indifferent whether to appeals for online transports to stop operating temporarily or not. Even though

literature rarely shows a no equilibrium situation, Yu and Wang [15] showed that this situation can happen, where the study found no equilibrium in the technology introduction problem.

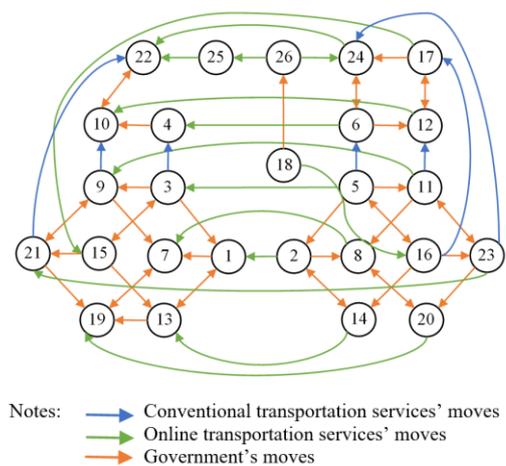


Fig. 3. Graph model for conflict in frame II.

#### IV. CONCLUSION

Based on the previous section, we can conclude that in the first frame the decision makers, government and conventional transportation services, was a willing move to the status quo scenario to another scenario. In this frame, scenario 9 is the equilibrium where conventional transportation services do not conduct intimidation and violence against online transport and Held mass demonstrations and strikes; online transportation services still operating; and the government Revoke Regulations Num. 32 of 2016 and Make regulation to legalize online transportation services. Eventually, the conflict was developed into frame II by the introduction of a new option from the government. In the second frame, the status quo (scenario 7) is stable for most of the decision-makers. However, the government was willing to move to another scenario (scenario 19), resulting in no equilibrium found in this frame.

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