Ride-sharing business model for sustainability in developing country: Case Study Nebengers, Indonesia

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Abstract. The growth of population and urban economy increased the need for humans’ mobility to support their activities. On the other hand, online Information and Communication Technology (ICT) is growing rapidly and more affordable. Within few years, there is some sharing economy business formed by using online platform. This condition brings through the emergence of ride-sharing business model using an online platform which can be beneficial to sustainability. This research aims to explore one of ridesharing business models which use the online platform and its impact on sustainability. This research used the procedure of case study method with a single case study of Nebengers. This research explores the case study with the scope of this research is limited by using several conceptual frameworks, they are sharing economy business model, four elements of a business model for sustainability (BMfS), Social Construction of Technology (SCoT), sustainable mobility and agency theory. Nebengers is a sharing economy business using online platform that historically can be explained using Social Construction of Technology (SCoT) Theory. There are conflicts between nebengers entrepreneur and the city government. Nebengers disrupts traditional and formal public transportation services which are managed by the government. However, nebengers also contributes to achieve the city government goal in developing sustainable mobility. The future challenge is how to arrange ride-sharing collaborative governance business model for sustainability in the cities in Indonesia.

1. Introduction
The growth of population and urban economy increased the need for humans’ mobility to support their activities. On the other hand, online Information and Communication Technology (ICT) is growing rapidly and more affordable. Within few years, there is some sharing economy business formed by using online platform. This condition brings through the emergence of ride-sharing business model using an online platform which can be beneficial to sustainability. This research aims to explore one of ridesharing business models which use the online platform and its impact on sustainability. This research explores the case study with the scope of this research is limited by using several conceptual frameworks, they are sharing economy business model, four elements of a business model for sustainability (BMfS) [1], Social Construction of Technology (SCoT) [2] [3], sharing mobility for sustainable mobility [4] and agency theory [5]. Nebengers is a sharing economy business using online platform that historically can be explained using Social Construction of Technology (SCoT) Theory.

| Table 1. The elements of sharing economy business model [6] [7] |
| Aspect | Description |
|---|---|
| Sharing economy business: platform for collaboration | • Types of platforms used in delivering services
• Role and functionality of the platform
• Specific use of the platform by the users, customers and company
• Types of activities performed by the company and users while interacting
• Degree of platform centrality to the company's core |
| Aspect                          | Description                                                                 |
|--------------------------------|-----------------------------------------------------------------------------|
| Under-utilized resources       | • Kind of users’ resources which the peers share to enable sharing         |
|                                | • Reliance on the excess capacity of users                                 |
| Peer-to-peer interaction       | • Types of peer-to-peer interactions                                      |
|                                | • Types of peer-to-peer transactions                                      |
|                                | • Relevance of interaction and transaction to business model and performance|
| Collaborative Governance       | • Legal structure, equity model, governance structure and mechanism, decision-making processes, consultation, and CSR and engagement strategies |
| Mission-driven                 | • Formal mission statement                                                |
|                                | • Relevance of social and environmental value and impacts in relation to economic value and to the business as a whole |
|                                | • Evidence on how the mission is implemented: strategies, practices        |
| Alternative funding            | • Type of funding and stage in which the funding is requested/used.        |
|                                | • Extent to which the business utilizes or prioritizes alternative funding such as crowdfunding, equity-based crowdfunding or similar |
| Leverage on technology         | • Type of technology used by the business                                  |
|                                | • Relationship between the technology in use and the core business         |
|                                | • How the business uses technology to operate                              |

**Table 2. Elements of a Business Model for Sustainability (BMfS) [1]**

| Element               | Definition                                                                 |
|-----------------------|-----------------------------------------------------------------------------|
| Value proposition     | Provide measurable ecological and/or social value in concert with economic value |
| Supply chain          | Involve suppliers who take responsibility for their own as well as for the focal company’s stakeholders |
| Customer interface:   | Motivate customers to take responsibility for their consumption as well as for the focal company’s stakeholders |
| Financial model       | Reflect an appropriate distribution of economic costs and benefits among actors involved in the business model and accounts for the company’s ecological and social impacts |

2. Result and discussion

2.1. *Nebengers profile and social construction of technology of Nebengers application*

This sub-section describes *Nebengers* profile based on information source from *Nebengers* Company. *Nebengers* is a social movement to give each other a ridesharing which exists nowadays with a lot of popular online transportation. There are about 80,000 members of the community and 150 private vehicles active in *Nebengers* application. There are some conditions when Nebengers can be relied on, such as a daily going home trip, homecoming trip, and weekend activity to commute out of town. Nowadays, *Nebengers* is managed by five young people, including Andreas Aditya Swasti, an IT department employee at a private company. This community was started in 2011 when Andreas was aware that the cause of traffic jam in Jakarta is the higher increase in the number of vehicles than the growth of existing road length. Then, Andreas Aditya Swasti thought how to get to a destination without riding either his private vehicle or public transportation which sometimes is uncomfortable.
The answer is carpooling or ride-sharing with someone’s vehicle with the same destination or direction. The idea started with creating a Twitter Account named Nebengers. This account would help people to find their carpool partner with the same destination. The carpooling is also based on the agreement among each member of the Nebengers community. Then, Nebengers begins to demand, especially by citizens of Jakarta and Bandung. This concept is considered suitable for those who need to commute between the two cities. Currently, Nebengers also becomes an alternative transportation in mudik season at Ramadhan Idul Fitri. Nebengers evolves not only ride other people's vehicles, but also become a community where they can share with others who need it. This community also can make a new friendship because it is not just a ridesharing to the same destination, but also a new meeting which can continue to the next one.

The Nebengers app is an app that can help urban citizens in carpooling activity. This app has been designed to answer the needs of carpooling and the performance assessment of Nebengers for almost 3 years. In the previous platform, which is Twitter, there are some difficulties in quantifying some activities, such as how many trips occur each day and the most crowded route per days. This new platform is expected to assess its performance, and estimate solutions to develop Nebengers as one of the Smart City transportation solutions in several cities. In addition, the previous platform, Twitter is limited for those who have a Twitter account. Therefore, with this new platform, Nebengers gives access to everyone who will be able to do carpooling activities.

This platform features "Create Tebengan" for those who have an empty seat in their vehicle, and want to share it. They can choose routes, departure schedules and sharing either the cost of gasoline or toll fee per person. Beside, people who want to do ridesharing can use 'Search Tebengan' feature, then they will be able to book a seat and negotiate for the payment with 'Chat' feature. Afterwards, the rider who shares the empty seat can either "Approved" or "Reject".

With the Notifications and Chat feature, the communication of rider and the passenger can be simplified. When meeting at the meeting point, the rider is required to press the "Getting Started" feature to indicate that the trip begins. If the trip is over, the rider will press "End the Trip" feature. After the trip, the passenger can review the trip with the rider.

Nebengers is a ride-sharing marketplace which helps to connect between the owners of the empty seat in their vehicle named as "Captain", with “Passengers” or the one who wants to do ridesharing. Nebengers makes a community, so users can do a ride-sharing with another users who are registered at nebengers.com to save their travel cost, make new friends, share experiences and support the green environment. To make sure everything works well, fun and rewarding for both Nebengers users and managers, Nebengers sets terms and conditions agreement. Nebengers does the following things:

a. Provide applications in the form of websites, Android and iOS so users can provide a ride and look for a ride
b. Do accuracy calculation on the trip route submitted. Submitted data does not violate ethics such as SARA, pornography and other matters that interfere the user's security and convenience
c. Nebengers may provide user-related data, travel transactions that occur in cases of criminal offences and crimes.
d. Nebengers invites its users to post the route on the application website, android or iPhone
e. Provide social media information to the users about both rider and passenger in consideration for those who want to go together
f. Provide a verification system for rider/captain and passenger.

Nebengers does not do the following things:

a. Provide user A's recommendations to come with Captain B.
b. Misusing personal data and harming its users
c. Provide a personal mobile number to other users.

Nebengers users need to do the following things:

a. Obey the ethics and laws under the Indonesian Constitution of 1945
b. Post on the Nebengers app to give a ride or look for a ride

c. Maintain the security and comfort of other users.

d. Make timely appointments.

If people are looking for a ride in Nebengers using Twitter, people can use this hashtag #CariTebengan and make a new tweet using this format, for example 

"#CariTebengan Jakarta-Bandung | 1 seat | 21 Maret 2016 09:00 | share gasoline and toll". People also can use Nebengers Application with the following steps:

1. Search Destination
   Enter your destination in “Tujuan” box.

2. Booking a seat
   If there are some provided routes, you can choose a route that you want. Then, you will get the carpooling detail. You can either contact the rider by pressing Chat icon in the top right corner or book a seat by pressing ‘booked a seat’ button.
3. Meeting and Starting the trip
Soon after the customers press the button "Pesan Kursi", their request has already been logged in to the Rider. If it is approved, then they will get a notification.

Nebengers is a community that consists of people who are willing to do ride-sharing. In the first phase, Nebengers’s members communicate via social media twitter. The next phase, Nebengers develops a mobile app namely Nebengers. In the Social Construction of Technology (SCoT) perspective, the online platform Nebengers is developed to facilitate ride-sharing behavior.

2.2. The characteristics of the ridesharing business model for sustainability
This section discusses the details description of characteristics of the ride-sharing business model for sustainability.

2.2.1. Platform and technology. Type of platforms used in delivering services is an online platform. The technology used initially is social media and then Nebengers application is developed as the online platform. The role and function of online platform are to facilitate the person who wants to
involve in ride-sharing activity. The online platform is used for transactional media of ride-sharing information. The platform is used by Nebengers company to determine the performance of Nebengers application and the activities of Nebengers community. Online platform plays an important and decisive role in the successful Nebengers activities. The online platform facilitates Nebengers community interaction quickly and widely. If there is no Nebengers application platform, it can still be run by utilizing Twitter.

2.2.2. Mission-driven and value preposition. The Nebengers company claims that Nebengers application can be a smart city transport solution in several cities in Indonesia. Formally nebengers states that the objective values to be achieved are:

a. 3 Cars Being 1. Private vehicles leave many empty seats; therefore, let us get together to overcome the traffic jam.

b. More efficient. By sharing, the transportation is more cost-effective and makes the trip more efficient.

c. More fun. The beauty of sharing empty seats, reducing city congestion and expanding friendship for business as well as spouse.

Nebengers also claims that ridesharing has benefits among others:

a. Transportation cost savings (gasoline and toll fee)

b. Travel expenses (gasoline and toll fee) can be split together so that the trip becomes more efficient and economical.

c. Add companions.

d. Environmentally friendly.

e. Expand business relationships.

f. Minimize stress during traffic jam because there is a friend on the road

In other words, the value of the Nebengers can reduce emissions and congestion, and subsidize driver costs.

2.2.3. Underutilized resources and supply chain. The vehicles used are private vehicles owned by people who want to share their vehicle. The offered vehicle has an unused empty chair (underutilized).

2.2.4. Peer to peer interaction and customer interface. The transacting party in the ridesharing was originally a colleague of close friends, neighbors, and peer to peer. Then, the party participating in ridesharing could be anyone who can come. Related to this, there is a security issue, but to minimize it, Nebengers makes a mechanism that ride-sharing community must register first with their identity. Then, there is a review and rating mechanism to validate the truth or make sure that the parties are safe. Ride-sharing community may mutually reject if it does not match, and it is okay to accept if it fits. In other words, those who can join are close friends, neighbors, and even new people who then become friends. If they are appropriate, they will be involved in continuous ride-sharing when the seat is available. There are also thirteen users out of twenty users who are satisfied by Nebengers services. It indicates that nebengers does a nice job at interacting with the one who has an empty seat and the passengers.

“Warid, a Student who used Nebengers said that the services of Nebengers is as good as an online taxi in a good way, and it was a great experience. Because the members of Nebengers are nice and friendly. According to him, Nebengers is non-money oriented service like any other online taxi services, that is why the members of Nebengers are nice and friendly.”

2.2.5. Type of governance. The governance model is private corporate. There is a partnership with sponsors.
2.2.6. Financial model/alternative funding. At first, the founders of Nebengers practised their own ride-sharing culture with their close friends. Then, the founders of Nebengers propagated the idea and used Twitter platform. At that time, the founders of Nebengers only facilitated it without getting any profit from the transaction. Transaction payments are made by the ride-sharing community self. Then, the Nebengers company has created the Nebengers application which facilitates the transaction of ride-sharing community. The Nebengers company gets the profit from downloading apps activities by ridesharing community on Android and iOS. Nebengers company gets revenue from sponsorship from various parties such as Top 1, Nu Green Tea, SmartFren, Indosat Ooredoo, XL, Telkomsel, Ice Cool, Datsun, Garda Oto, and Hard Rock FM Jakarta. In other words, the ride-sharing community payment is based on the agreement. Meanwhile, there is no payment from ride-sharing community to Nebengers application company for each ridesharing transaction.

2.3. Nebengers contribution to sustainable mobility
Nebengers community mobility activities is a form of sustainable mobility because it reduce local transportation’s environmental footprint through reducing the utilization of car and fossil fuel consumption. The evidence that Nebengers contributes to creating sustainable mobility is based on information from one of the Nebengers community members that changes his mobility mode from private car utilization to ride-sharing. Based on our survey of twenty users of Nebengers, there are four out of twenty users chose this reason about why they do carpooling activity, because they want to reduce air pollution in Indonesia.

Mr. Yudhi is a 36-year-old male entrepreneur who regularly uses the Nebengers application from Bandung (Gasibu) to Jakarta (Cibubur). He uses Nebengers application once or twice a day. His level of education is Bachelor. At first, he used Twitter and then used the Nebengers app. Before he joined Nebengers, he used a private vehicle from Bandung to Jakarta. He spent Rp 75,000 per trip. The motivation of his involvement in Nebengers ride-sharing community is to reduce transportation costs and meet new friends.

In our survey, there are fifteen out of twenty users do carpooling activity. They used to drive their private car. They have changed their mobility mode from private car utilization to ride-sharing. At this point, Nebengers community mobility activities is a form of sustainable mobility because it reduces local transportation’s environmental footprint through reducing utilization of car and fossil fuel consumption.

2.4. Principal-agent relationship of Nebengers entrepreneur and city government
Online transportation in Indonesia is regulated by Transportation Ministry Regulation Number 108 Year 2017 about organizing non-route public vehicles/transportation. Based on the review of the regulations, it is identified that Nebengers is a legal subject that is regulated as a land transportation application company. Meanwhile, the members of Nebengers ride-sharing community are not public transport companies. They are not subjected to the law in the regulation. However, based on agency theory, there is a principal-agent relationship between city government in Indonesia and Nebengers entrepreneur. The city government is a principal, on the other side, Nebengers entrepreneur is an agent. There are conflicts between nebengers entrepreneur and city government. Nebengers disrupts traditional and formal public transportation services managed by the government. Nevertheless, Nebengers also contributes to achieve city government goal in developing sustainable mobility.

3. Conclusion
Nebengers is a community that consists of people who are willing to do ride-sharing. In the first phase, Nebengers’s members communicate via social media Twitter. The next phase, Nebegers has developed an mobile app namely Nebengers. In this case, the online platform nebengers was developed to facilitate ridesharing behavior. The characteristics of nebengers are using peer to peer (P2P) platform type and underutilized shared resources. According to four elemenets of a Business Model for Sustainability (BMIS), nebengers’s values are to reduce emissions and congestion, and
subsidize driver costs; nebengers’s supply chain is personal vehicle; nebengers’s customer interface is colleagues or neighborhood; nebengers’s financial model is small fees charged for users. Nebengers community mobility activities is a form of sustainable mobility because it reduces utilization of car and fossil fuel consumption. Based on agency theory, there is a principal-agent relationship between city government in Indonesia and nebengers entrepreneur. The city government is a principal, on the other side, Nebengers entrepreneur is an agent. There are conflicts between Nebengers entrepreneur and city government. Nebengers disrupts traditional and formal public transportation services managed by the government. However, nebengers also contributes to achieve city government goal in developing sustainable mobility. The future challenge is how to arrange a ride-sharing collaborative governance business model for sustainability in the cities in Indonesia.

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