

# A study of measures to raise awareness of counterparts in technical cooperation project –A Case study of the Cambodia Bus Authority Capacity Improvement Project-

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Phnom Penh City Bus Authority(the CBA) has operated of public buses since 2014. However, even though the CBA has expanded bus routes and improved their service to customers up to now, their share of total traffic remains low. We conducted a consciousness survey to bus company's staff and citizens regarding the bus services. As a result, it turned out that the information on the bus service is not adequately conveyed to citizens. By grasping this situation, the CBA recognized the importance of awareness of citizens and decided to start aggressive public relations activities. This mitigation of information asymmetry will lead to the improvement of the motivation of Phnom Penh City Bus Authority, and is expected to contribute to the improvement of the sustainability of JICA's technical cooperation. In this paper, we discuss the increase in the CBA's self-reliance in the project due to the mitigation of asymmetry of information in the Phnom Penh city bus project in Cambodia.

**Key Words:** *Public Bus, Sustainability, Awareness, Asymmetric Information, Autonomy*

## 1. Introduction

JICA implements technical cooperation to strengthen the capabilities of developing country governments. JICA's technical cooperation policy makes it necessary for the recipient government to continue using the knowledge gained by the project after the implementation period of JICA's cooperation

However, in the JICA Evaluation Report (FY 2016)<sup>1)</sup>, through ex-post evaluations (internal evaluation:evaluate 2 - 10 hundred million Japanese yen

level projects) of projects, it is seen that over 80% of projects (68 samples) have issues of sustainability. By confirming the each evaluation report of the technical cooperation projects in this Evaluation Report, we found that over 90%(40 cases) of the 44 cases had some issues of sustainability. This indicates that there are some difficulties for the developing countries themselves in continuing to implement the knowledge gained by the projects after the cooperation period. And it seems that the issues of sustainability are particularly serious in technical cooperation.

JICA has tried many different approach to ensure the developing countries' sustainability in post technical cooperation. JICA has recognized by its experiences that it is important for developing countries to understand the value of what the project practiced and to have incentives to continue it. A typical example of this is the SHEP (Smallholder horticulture empowerment and Promotion) approach<sup>2)</sup> (Fig.1) that uses the idea of eliminating the asymmetry of information given to horticultural farmers and improving farmers' incentives to practice self-determination theory. However, although the SHEP approach is widely practiced in agricultural projects, it has not so spread to other fields.

In this paper, we introduce one trial study: the improvement of sustainability in the JICA bus project in Phnom Penh city, Cambodia. In this trial study we are trying to mitigate the asymmetry of information between the Phnom Penh City Bus Authority (Hereinafter the CBA) and Phnom Penh citizens and thereby to improve awareness and incentive for improvement of the CBA bus service

First we grasped the asymmetry of information between the CBA and citizen through an awareness survey. Second, we assisted the the CBA side to understand the asymmetry of information through an analysis of our survey data. Third, confirming their awareness, we discussed the CBA's approach. And finally the CBA side decided to prepare a PR video and hold a workshop as a measure that would mitigate the asymmetry of information between themselves and citizens.

In this paper, we explain these methods and these results, and show the improvement in awareness of the CBA. We discuss the above-mentioned measures and the ways to mitigate the asymmetry of information in public transport projects. Finally,

we suggest a measure to improve the awareness of developing countries

## 2. Information asymmetry and its Mitigation

Information asymmetry is a theory developed by Akarov<sup>3)</sup> in 1970. The suggestion that the unequal information structure when there is a difference in the information held by each trading entity in the market and it is regarded as a state where information and knowledge cannot be shared. It refers to situations where market faults arise due to the information difference between sellers and buyers that means that Pareto optimality does not occur.

Mitigation of information asymmetry is to correct mutual information disparity<sup>4)</sup>. If the asymmetry of information is mitigated, the market will be headed in the appropriate direction. Among the JICA projects, the SHEP approach (Fig.1) focuses on information asymmetry and is a unique effort to develop a mitigation measure of information asymmetry. In the SHEP project, farmers conduct market research and the government side provides market information to raise their awareness. Farmers are approached to produce crops that match market needs and make more income.<sup>5)</sup>

Even in bus management, information gaps between the CBA as the service provider side and the passenger side is possible. When the contents of bus services are not adequately conveyed to the user or the needs of the user are not grasped by the CBA side, Information asymmetry will occur. Mitigating this information asymmetry makes improvement of bus services and increases in the Bus users possible.

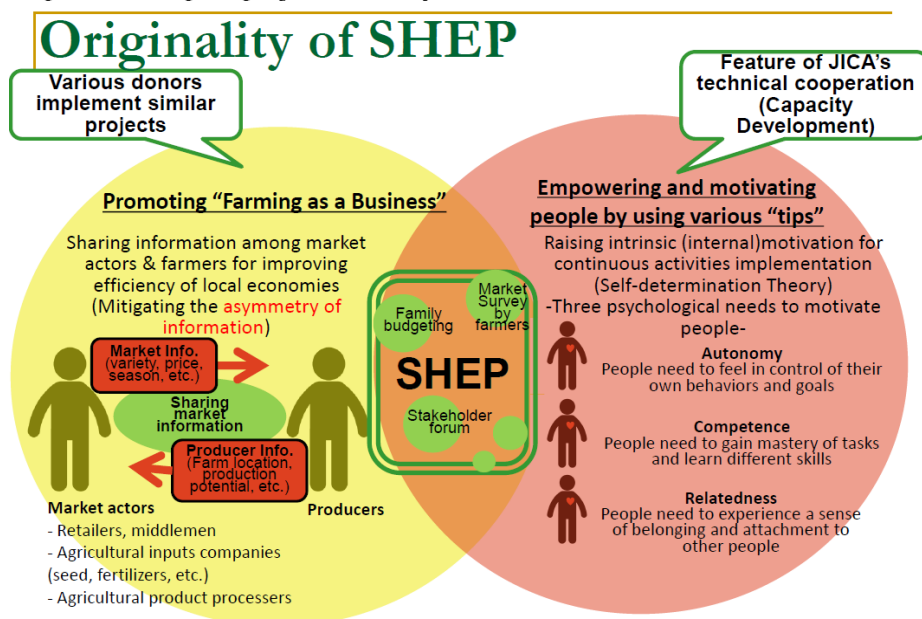


Fig.1 Outline of SHEP Approach

### 3. The CBA's business and the JICA project

Phnom Penh city is the capital city of Cambodia and has a population of 1.6 million, but for long years, no public transportation has been available. Transportation within the city has been limited to private cars, bikes, motorbike taxis, tuk-tuks and taxi services (this last service started from 2012). In addition, the number of private cars and motorbikes has dramatically increased due to population and economic growth. Presently, motorcycles make up 80% of road traffic. This is one of the reasons that there is traffic congestion, and indicates a serious need for more effective traffic management. (Fig.2)

Considering this situation through a project request from the Cambodian Government, JICA carried out the development study, "The project for comprehensive urban transport plan in Phnom Penh capital city (PPUTMP)" from 2012 to 2014. The final report of this study recommended that Phnom Penh city should open and expand the bus network as a short term strategy, and build urban railway lines as a long term strategy.

Based on the Development Study's recommendations, the CBA began operating buses operation on a single route in March 2014. Later in 2014, the CBA expanded the initial bus routes to three routes in 2014. After approximately 100 buses were provided from China in July 2017 (Fig.3), in October of the same year the routes were expanded to 8. (Fig.4) In response to the recommendations of the Development Study "PPUTMP," the CBA has thus undertaken the necessary implementation measures as far as possible.

On the other hand, passengers numbers show that the average user of the bus service was 20,000 trips a day in February 2018. Buses contribute only about 0.62% of the total number of trips in Phnom Penh (the PPUTMP study calculated that the total number of trips/day in Phnom Penh City was 3,216 thousand excluding "walk" trips in 2012).



Fig.2 Phnom Penh City's Traffic congestion



Fig.3 Phnom Penh City Bus provided by Chinese Government



Fig.4 City Bus present operation route

Thus, there is not yet in a situation in which bus services can contribute to the improvement of the urban traffic situation sufficiently. In view of this situation, JICA started to implement a technical cooperation project for the CBA's capacity building "The Project for Improvement of Public Bus Operation in Phnom Penh (PiBO)," from January 2017.

The objectives of the PiBO project are:

- (a) Improving the services of public route buses by improving the management system of the the CBA;
- (b) Improvement of traffic policy including mobility management.

And the overall goal of PiBO project is to increase bus transport's share of urban transportation and accelerate a shift of Phnom Penh's traffic services to public transportation.

## 4. Measures used in the study

As of February 2018, the total number of Bus trips was not large, at about 0.62% of all trips in Phnom Penh. We focused on situations in which modal shift public buses has not proceeded smoothly. This time, we conducted a questionnaire survey on the consciousness of bus users, bus non-users, and CBA officials. Also we conducted an interview survey of the management team of the CBA. After collecting these data, we analyzed the gap between the CBA's bus services and the actual requirement of the user side. In particular, regarding the points that differ in the consciousness of bus non-users and the consciousness of the CBA, these were seen as the occurrence of asymmetry of information, and summarized as a point to be noted.

### (1) Questionnaire survey

We conducted a questionnaire survey from August 3 to August 14, 2017, to 450 citizens on the buses, 450 citizens who did not use the buses, and 223 CBA officials. We got 449 samples from bus user, 450 samples from non-bus user, and 191 samples of CBA officials. In the questionnaire survey, we examined personal attribution (gender, occupation, age, income, residential area) and the following 10 questions were used in the consciousness survey. In these questions, we allowed 3 choices, "Expensive, Reasonable, Cheap" for question "① Bus fare," and 5 choices, "Very Poor, Poor, Average, Good, Excellent" for the other questions:

- ① The bus fare;
- ② Newness of the bus vehicle;
- ③ Convenience of the bus route;
- ④ Reliability of the bus schedule;
- ⑤ The bus arrival frequency;
- ⑥ Bus speed;
- ⑦ Ride comfort;
- ⑧ Courtesy of drivers and conductors;
- ⑨ The bus stop facilities;
- ⑩ Safety;

We used average and standard deviation to analyse these data. In addition, a t-test was conducted to verify that there were a significant differences in the average of the three-group data set.

### (2) Interview survey of the CBA executives

We conducted interviews with the President of the CBA, the General Affairs Department Manager, the Finance and Accounting Department Manager, and the Technical Department Manager regarding the opinion of the CBA management. The following topics were covered:

- (a) Management status of current CBA;
- (b) Opinions on strengthening CBA administration
  - Increase bus routes
  - Introduction of new buses
  - Introduction of ICT system to buses
  - Strengthening financial aspects
  - Streamlining the operation system
  - Improve service to users
  - Review of Fares

For the analysis of this interview survey, we translated the interview record into English. Using this data, we carried out text mining to grasp the CBA management side's consciousness and to find the relationships in their words. In addition, we conducted a scenario analysis using the persona method so that the CBA managers' idea and consideration are made visible.

## 5. Analysis

### (1) The result of the consciousness survey

The results are shown in the following tables and figures.(Table 1, Table 2 and Fig.5)

Table 1 The result of consideration of ①The bus fare

	Cheap		Reasonable		Expensive	
CBA Staff	46	25.6%	132	73.3%	2	1.1%
Bus user	127	28.3%	314	70.1%	7	1.6%
Non-Bus User	80	17.8%	349	77.6%	21	4.7%

Table 2 The Average and Standard of response for 9 indicators by the CBA, Bus users, Non-bus users

	②Vehicle	③Route	④Schedule	⑤Frequency	⑥Speed	⑦Comfort	⑧Courtesy	⑨Bus stop	⑩Safety
Bus company	4.63	3.34	3.12	3.65	3.64	4.46	4.08	3.21	4.58
(SD)	(0.55)	(0.96)	(1.00)	(1.00)	(0.71)	(0.63)	(0.75)	(1.00)	(0.58)
Bus user	4.37	3.65	3.60	3.69	3.76	4.19	3.80	3.33	4.44
(SD)	(0.59)	(0.75)	(0.81)	(0.79)	(0.68)	(0.64)	(0.71)	(1.66)	(0.69)
Non Bus user	3.76	3.04	3.02	3.14	3.21	3.64	3.38	2.97	3.99
(SD)	(0.85)	(0.86)	(0.77)	(0.80)	(0.79)	(0.80)	(0.73)	(0.89)	(0.89)

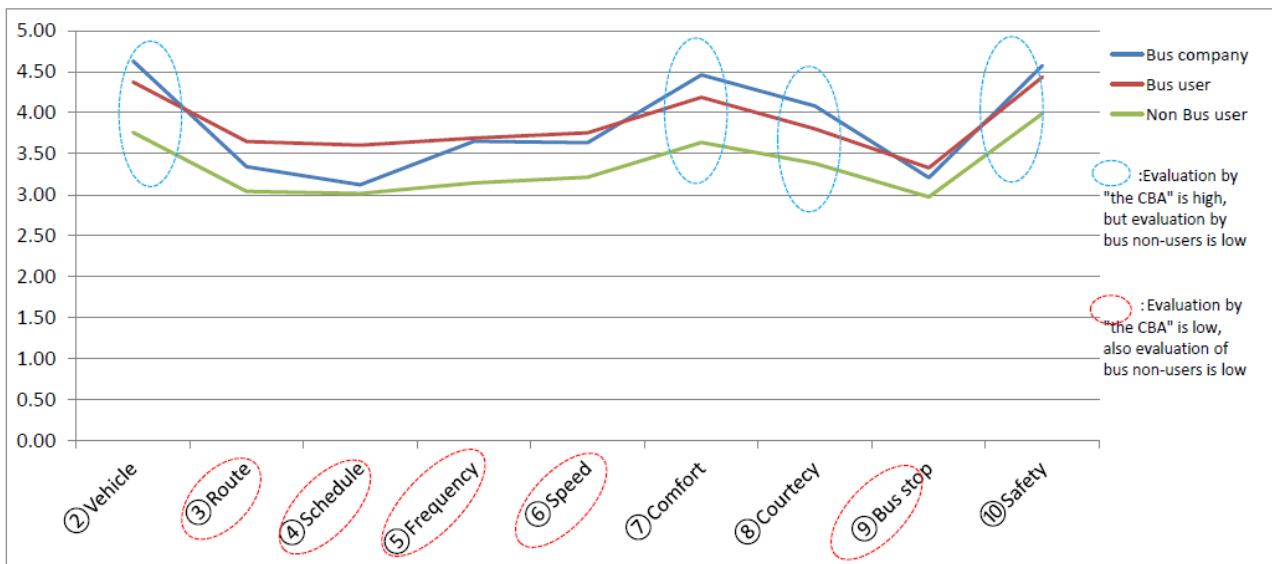


Fig.5 The proportion of average response for 9 indicators by the CBA, Bus users, Non-bus users

Regarding bus fares, most respondents evaluated these as appropriate or cheap (Table 1). This is due to bus fares being set at 1500 Riels (almost 0.4US\$ or 40 yen) and students, handicapped and elderly people given free travel. This information is also widely publicized by the government, so the person who do not use the bus should also be aware of this policy.

Regarding “③ Convenience of the bus routes,” “④ Reliability of the bus Schedule,” “⑤ The bus arrival frequency,” “⑥ Bus speed,” and “⑨ The bus stop facilities,” these were given low results by all three groups. For these low scored services, the CBA side had already recognized the problem. As a countermeasure against this situation, the CBA is considering the following measures with Pibo project:

- (a) Consideration of bus priority lanes: For the reliability of bus schedule and countermeasures to improve bus speed;
- (b) Improvement of Bus operation schedules: Improvement of frequency of bus arrivals;
- (c) Creating a bus map: publicizing the bus routes;
- (d) Introduction of a bus location system: by knowing the bus driving situation, users are able to reduce their stress from the problem of the reliability and frequency of bus operations;
- (e) Updating of bus stop facilities: consideration of countermeasures.

On the other hand, the CBA staffs and bus us-

ers gave high evaluations to “② Newness of bus vehicle,” “⑦ Bus ride comfort,” “⑧ Courtesy of drivers and conductors,” and “⑩ Safety,” but the non-passengers gave these factors low evaluations. Although bus renewal, and the improvement of crew manners due to project implementation and voluntary activities of the the CBA has occurred, unfortunately these facts have not spread to those who do not use the buses.

In addition, we performed principal component analysis on the results. (Fig. 6) In this analysis, The main component of the Dimension 1 (horizontal axis) were “⑤ The bus arrival frequency,” “④ Reliability of the bus Schedule,” and “⑥ Bus speed,” so we named it “Convenience”. The main components of Dimension 2 (vertical axis) were “② Newness of bus vehicle,” “⑦ The bus ride comfort,” and “⑩ Safety,” so we named this “Comfortability”. On these, the consciousness of the CBA and bus users were almost equal. However, non-bus users reported a clearly lower perception of both convenience and comfortability compared to the above two groups. From here we can also guess that the information to people who do not use the bus is insufficient. However, until this survey, the CBA side did not recognize that citizens who do not use the bus do not get enough information on their bus service.

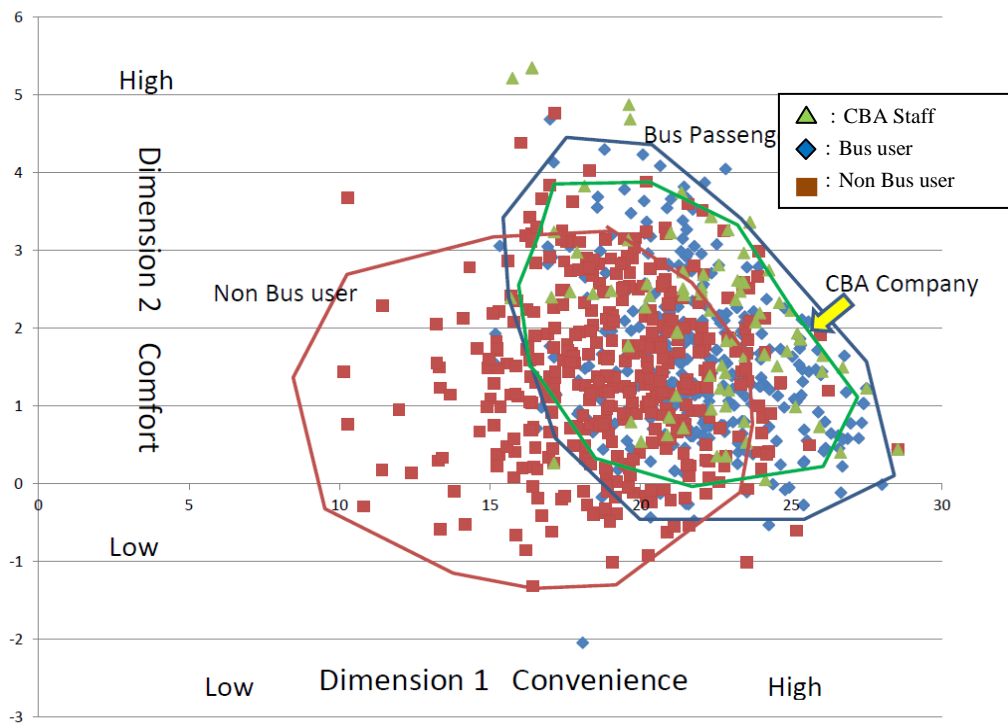


Fig.6 The result of principal component analysis the CBA, Bus user, Non-bus user

(2) The CBA Executive interview survey

We conducted text analysis on the results of the executive interview. The result are shown in Table 3. The CBA executives were mainly focused on bus business management, road traffic, introduction of cards, and services in buses. They almost did not refer to public relations or enlightenment activities in relation to the Phnom Penh citizens.

Next, we conducted co-occurrence network analysis to confirm the connection of the words.(Fig.7). The result show that the CBA executives intend to increase passenger number using bus routes expansion based on the new buses provided by China and improving passenger service by introducing prepaid cards. On the other hand, as of the priority lane, the connection with Phnom Penh City Administration was strong. This means that the CBA side regard this work is the duty of the city. Even here, increasing the passengers (word "more" and "people") is only connected with improvement of services, and there is no connection to informing Phnom Penh citizens that there will be better services. In this analysis, the CBA side also showed a low perception of the importance of public relations

Table 3 The result of Text analysis of Interview to the CBA executives

Category	Number of Words	Share
*Donor support	18	8.26%
*Government	14	6.42%
*Management	42	19.27%
*Organization reform	31	14.22%
*Traffic	52	23.85%
*Priority Lane	5	2.29%
*Bus route	24	11.01%
*Bus service (Travel)	11	5.05%
*Bus service (in Bus)	38	17.43%
*Rider friendly	6	2.75%
*ICT(mainly prepaid card)	40	18.35%
#no_codes	44	20.18%
N of Documents	218	



**Table 4** Scenario analysis (excerpts)

Theme	Interview Contents ( Scenario Method )	Compare with Questionnaires to people
Operation (Equipment)	In the past we use 57 units second hand bus from Korea but now we use new 60 units buses by Chinese cooperation, instead of those.	· Only those who do not use the bus have low evaluations for newness of bus vehicle and ride comfort, there is a possibility that it has not enough known the introducing new buses.
Operation (Fare)	Cheap fare is because the policy of government want to encourage people to use and to decrease poverty. This policy will also lead reducing traffic congestion and accidents in Phnom Penh City.	· For those who do not use the bus, many respondents said that they would use the bus if they can ease traffic congestion (44%) · Only those who do not use the bus scored low evaluation to the comfortability and the safety of the bus. Need more PR!
Staff Education	We educate and give instruction for good bus operation to our staff. When we see the vulnerable points, we' ll improve and strengthen these. All bus drivers have driver license and obtain training before admitting to work for CBA. Also we train Conductors. We hold a meeting once a month to check whether and what are the difficulties our staff confronts for bus operation and take measures to meet the problems.	· Only those who do not use the bus have low evaluation of the attitude of the bus crew. More Training and Need more PR!
Public relation	We broadcast information about the uses of public bus through Phnom Penh City Hall' s website and other media network. Regarding service improvement for bus users, we also promote to people to understand more.	· There should be campaigns in public relations regarding introduction of new bus vehicles, increase of routes, improvement of safety and services, countermeasures to reduce congestion, good environment, etc.

## 7. PR video creation and workshop implementation

### (1) PR Video creation

The PR video was mainly targeted at those who had never used a bus, and looked at the basic contents on bus use such as route introduction, riding method. It also appealed about the effect of alleviating traffic congestion, the ride comfort of the bus, and the safety. These contents were consciously reflected important issues of the consciousness data of the citizen who does not use the bus.(fig.8)



**Fig.8** Promotion Video, How to ride Bus

### (2) Contents of workshops

Workshops will be targeted at about 3 areas on each Bus route and invite 50 people per area. They will cover a total of about 1,200 people in 8 routes and will be held from May to June 2018.

The outline of the workshop contents are decided as shown in **Table 5**.

In order to grasp the current consciousness of the Phnom Penh Citizens toward the CBA and its services, we will first conduct a consciousness survey before the workshop. After the workshop, we will conduct a second consciousness survey (the contents will be the same as the first one) and the comparisons between them will be used for the conscious change before-after the workshop.

It is possible to be measured the change in consciousness after increasing services to 8 bus routes and other improvements. Also it is possible measure the change in consciousness due to the implementation of the workshop.

In addition to this, after the workshop, we will chose about 10 people from the invitees and have the opportunity for the CBA side to listen their opinions and to discuss how to make the bus business more attractive. The CBA side should find it possible to get the hints from here to incorporate into their operation and management.



Table 5 Tentative Flow of Workshop

Item	Contents	Participant
<b>&lt;Introduction · Purpose explanation &gt; Estimated number of participants: 30-50 people</b>		
Meeting		
· First Simple Questionnaire	· Answer the bus recognition and satisfaction	· Answer to a First simple questionnaire
· Explanation of purpose		
<b>&lt;Demonstration session&gt; Estimated number of participants: 30-50 people</b>		
· Video screening	· Show the video of the bus system	
· Bus Test-ride	· Test-ride on stopped bus · Lecture on how to ride	
· Presentation	· Explanation of bus priority measures etc.	
· Second simple questionnaires	· Collect a simple survey sheet after filling out	· Answer to a Second simple questionnaire
<b>&lt;Hearing session&gt; Estimated number of participants: about 10 people</b>		
· Additional questionnaire	· Additional investigation on traffic behavior and bus satisfaction / demand	
· Free opinion exchange	· Exchange of opinions on issues and requests of the bus system	
· Collection of additional questionnaire	· Collect additional survey form after filling in	

## 8. Conclusions

This study provided information on the change of consciousness required to increase the autonomy of developing countries side. By carrying out such surveys, the CBA side was able to grasp the needs of citizens that it had not previously known existed. Based on this finding, the CBA recognized the importance of public relations and other enlightening activities, and immediately started the consideration of measures to realize this knowledge.

On the CBA side, it became possible for them to understand the needs of Phnom Penh citizens with regard to bus services and take action on them. This is a good measure that can promote "Improving the reliability of bus services and mitigating road congestion by shifting to public transportation" which is the public bus provider's mission. Increased incentives and the improved awareness of the need to tackle improvement by the CBA side can make a positive spiral for their activity. Such an improvement in the autonomy of developing countries can be expected to ensure sustainability after project completion.

In this paper, we discussed the mitigation of information asymmetry for bus operations in developing countries and only showed examples of changes confronting operators. We will continue to conduct questionnaire surveys in the future and monitor the changes in the awareness of citizens and the mitigation of information asymmetry through these measures. Also, with the cooperation

between JICA and the CBA, we would like to confirm that changes in the awareness of the CBA officials themselves can be achieved by conducting an interview survey to improve consciousness and strengthen their autonomy.

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