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An Innovation Strategy for Public Transit Services using a Public-Private-People Partnership

Myungsik Do, Ph.D.[1], Wanhee Byun, Ph.D.[2] and Jung-Beom Lee, Ph.D.[3*]

[1]*Dept. of Urban Engineering, Hanbat National University*
[2]*Land & Housing Institute (LHI)*
[3]*Daejeon Development Institute*
[1]*msdo@hanbat.ac.kr*, [2]*whbyun@lh.or.kr*, [3]*rutgerskg@gmail.com*

Abstract

This paper proposes an integrated service management system for a public-private-people partnership (PPPP or 4Ps) of public transit services. In accordance with the trend to disclose public information, sharing the current large volume of public data with public and private companies and promoting the efficiency of financial affairs together with service assurance are critical issues for public transit services. Most local governments provide financial support to private bus companies in order to promote individual mobility by using a deficit covering method. However, local government's role is not only in transit service operations but also in service quality control under bounded financial capability. Taking the complexity and uniqueness of public transit services into account, this study proposes a systematic framework based on the principle of public-private-partnership (PPP or 3Ps) to outline the elements and associated guidance required for knowledge-based public transit services. Further, the concepts of the disclosure of public information and evaluation of public services are embedded into such planning in order to offer self-evolutional public transit services. An interactive transit service promotion mechanism can be established by cooperation between a private sector monitoring group and an academic and non-government organization (NGO) evaluation support group. The goals of the monitoring group are to check periodically overall transit services based on evaluation categories and to report evaluation records to the government on the internet. In this paper, the performance and overall scheme of a public and private partnership in the public transit service of Daejeon Metropolitan City is used as a case study.

Keywords: *Public-private-people partnership; public transit services; innovation strategy; information disclosure; knowledge-based management*

1. Introduction

Improved decision-making is perhaps the most promising element in electronic government (e-government). Further, the central idea in all decision-making is how to provide the optimum solution and how to obtain acceptance of a decision by citizens. Many politicians, administrators, and citizens are interested in increasing citizens' participation in public decisions. Such participation is a growing part of decision-making, although it remains troublesome in practice. In this context, Tulloch and Shapiro (2003) explored possible combinations that could exist between the presence and absence of access and participation in environmental decision-making areas.

Some initiatives are unable to work because administrative systems that are based on expertise and professionalism leave little room for a participatory process (King et al., 1998). Authentic participation by citizens, that is, participation that works for all parties

* Corresponding Author

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and stimulates interest and investment in both administrators and citizens, requires a rethink of the underlying roles of, and relationship between, administrators and citizens (King *et al.*, 1998). Table 1 summarizes the key differences between unauthentic and authentic participation models.

Table 1. Comparison of Authentic and Unauthentic Participation (King et al., 1998)

	Unauthentic participation	Authentic participation
Interaction style	Conflictual	Collaborative
Participation is sought	After the agenda is set and decisions are made	Early; before anything is set
Role of administrator	Expert technician/manager	Collaborative technician/governor
Administrative skills needed	Technical; managerial	Technical, interpersonal skills, discourse skills, facilitation skills
Role of citizen	Unequal participation	Equal partner
Citizenship skills needed	None	Civics, participation skills, discourse skills
Approach toward "other"	Mistrust	Trust
Administrative process	Static, invisible, closed	Dynamic, visible, open
Citizen options	Reactive	Proactive or reactive
Citizen output	Buy-in	Design
Administrator output	Decision	Process
Time to decision	Appears shorter and easier but often involves going back and "redoing" based on citizen reaction	Appears longer and more onerous but usually does not require redoing because citizens have been involved throughout; may take less time to reach decisions than through traditional processes
Decision is made	By administrator/politician and/or administrative processes perhaps in consultation with citizens	Emerges as a result of discourse; equal opportunity for all to enter the discourse and to influence the outcomes

Given the general decline in the provision of public services, new approaches are being devised with a view to increasingly realigning the responsibilities between the public sector, the private sector, and civil society. With the increase in the size of the system, the role of the government or municipal authorities becomes important (Chakrabarti *et al.*, 2009). It is expected that the private sector, with its dynamism and flexibility, can fill service delivery gaps by forming partnerships with the public sector. Such partnerships can support the private sector with the payment of service charges; but more importantly, they can play an active role in improving the accountability and service quality of both the

public and private sectors. However, a radical shift in the role of citizens from passive service receivers to active service partners may not occur endogenously (Ahmed and Ali, 2006).

Almost all of the world's population growth between 2000 and 2030 is expected to be absorbed by the urban areas of the less developed regions (UN, 2004). There is likely to be a corresponding rapid increase in the demand for transit services. However, municipalities lack the financial resources and skills needed to cope with this problem. This raises the important issue of how to deliver a quality service in the face of the financial and skill constraints of the public sector. Under a public-private partnership (PPP or 3Ps) arrangement, public and private sector agencies share responsibility for providing a service. The arrangement can take many forms, but the common distinguishing feature is a shared governance structure and decision-making process. Moreover, a third tier, the people, is often overlooked in the service delivery framework. Citizens can contribute significantly to service delivery and improve it by supporting the private sector to form a partnership with people. This paper examines the role of facilitating agencies in developing a tripartite "public-private-people" partnership for the public transit service in Daejeon Metropolitan City, Korea.

In Daejeon, a facilitating agency has attempted to link citizens to the public and private sector to achieve effective public transit service delivery. The involvement and the success of the facilitating agency have varied compared to other cities, presenting an opportunity for an investigation into the work and effect of the public-private-people partnership (PPPP or 4Ps) in the public transit service. In this regard, the project management unit in Daejeon has attempted to build a relationship among the municipality, the private sector, and citizens through joint exercises such as seminars and public meetings.

This paper documents that it is possible to achieve a 4Ps model. A strong partnership was observed in Daejeon, where the municipality, a non-government organization (NGO), and citizens work together for an improved public transit service. The main findings of the study are as follows.

- One of the major contributions of the facilitating agency has been to inject new ideas of service delivery under the 3Ps model.
- A significant achievement has been to build a relationship among the municipality, the NGO, and the citizens.
- The facilitating agency must have sufficient expertise in order to support the 3Ps model successfully.
- The most significant contribution of the facilitating agency has been the demonstration of a workable partnership model and the bridging of the gaps among the public sector, the private sector, and citizens. The facilitating agency has bridged these gaps through consultative meetings and the creation of platforms for discussion.
- The public sector lacks the capacity to conceptualize and implement innovative approaches. The public sector does not have the funds for experimentation with alternative approaches. It also has limited access to the latest advancements in management and technology. The facilitating agency has made new ideas available to the public sector and built its capacity through training and workshops.
- It is not possible for the private sector to conduct advocacy for the 3Ps model. The facilitating agency has acted as an intermediary for the public sector, the private sector, and citizens. This has improved access amongst the three stakeholder groups.

In general terms, the public and the private sectors are used to working separately and the concept of partnership is foreign to them. Therefore, a third party is often responsible for bringing the two sectors together to form a 3Ps model. In a traditional arrangement, the public sector provides a service but is not directly accountable to citizens. The citizens complain about a poor service through policymakers. This is the "long route of accountability" that is often not very effective. Citizens also buy goods and services from the private sector. In this case, the service provider is directly accountable to citizens through the "short route of accountability" because poor service immediately results in a loss of business. The 4Ps model provides a marriage of the two accountability routes. When the 4Ps model is applied for a common cause such as a public transit service, both the long and short routes of accountability are in force.

In this paper, an innovative strategy is introduced to improve public bus services in Daejeon using the 4Ps concept to promote public transport and to pursue the aim of developing public transport's future. Further, in order to settle the city's traffic problems, national and international examples of innovative strategies about people's participation are compared. Finally, supporting traffic service methods are described in creative cities based on current knowledge including that of expert groups.

2. Innovative Strategies that Support Public Transport Services using the 4Ps Model

2.1. Study of Existing Cases

Since the mid-1990s, the introduction and expansion of information and communication technology (ICT) such as information technology (IT), biotechnology (BT), and nanotechnology (NT) have brought about significant technology innovation. The propagation of the internet and mobile phones has changed our lifestyles and behavior patterns (Yigitcanlar and Lee, 2014). However, as a result of this growth-oriented policy, social polarization and severe environmental problems have occurred. In the transport field, the rapid growth of the number of private cars has led to many problems such as noise, dust, traffic congestion, and traffic accidents. In addition, most cities have faced a problem with transport support services and the need to help with the transportation issues of vulnerable and lower income groups. Providing public transportation such as bus services and the metro is regarded as an alternative to resolving traffic, environmental, and transport support problems.

Various activities based on experience and knowledge accumulated from daily life have been used to develop sustainable cities. Community-based innovation activities, which combine community activities in a local unit with technology innovation and the Living Lab approach, reflect users' viewpoints in the innovative process and are typical innovative activities in which people (users) participate. The connection between users' participatory activities and public transport service improvement has not yet been determined but is considered by the 4Ps methodology in this paper. Community-based innovation is a concept that combines community action in a location unit with technology innovation and is conducted on a social economic basis such as a social enterprise or cooperative association. In addition, community-based innovation focuses on cooperation among citizens and a common realization of value rather than economic benefits. For example, the Community Innovation for Sustainable Energy (CISE) scheme is a typical example that uses 12 steps to target local communities (Seyfang *et al.*, 2013). The CISE scheme operates a community-owned renewable energy power plant and provides the type of energy that users want to be supplied with.

The Living Lab, which is also called the user-centered open innovative ecosystem, was

constructed to reflect users' viewpoints and enables users to participate in innovation activities. It was established by William J. Mitchell, a professor of the Urban Planning Department at the Massachusetts Institute of Technology (MIT) (Eriksson et al., 2005). The Living Lab is an open innovative model that settles problems with the active participation of the final users in certain locations or regions and enables development that reflects the needs of regions and users. Recently, users have also participated in development activities by providing development ideas. The Living Lab has been extended to the 4Ps model, in which the public sector, the private sector, and people come together from the existing 3Ps model and in which the gap among the steps of technology development can be reduced by mutual operations. In addition, because the Living Lab includes users' participation, cooperation between the public and private sectors, open innovation, and the utilization of ICT, it has the benefit of being able to settle local problems and treat sustainable development issues flexibly (Alcotra, 2011). As of October 2013, the Living Lab has spread to encompass 354 projects and this trend of growth is ongoing. 287 (80.6%) of the 354 Living Labs are in Europe and 67 (19.4%) are distributed elsewhere. The activities of the Living Labs tend to focus on citizens and local societies and cover issues such as energy, residences, traffic, training, and health (Song *et al.*, 2013). As a result of the investigation about the Living Labs' activity disciplines by Alcotra (2011), it is understood that the development activities are connected closely to actual living. For example, areas such as energy, architecture, traffic, logistics, health, and well-being account for over half of the overall activities.

In Korea, 4Ps models exist in the environmental sector but there are almost none related to traffic issues. However, citizen monitoring groups that evaluate city bus services similar to the one in Daejeon are benchmarking the activities in Daejeon and enforcing these in the cities of Seoul, Daegu, Jeonju, and Gwangju. In particular, Jeonju city is collecting and evaluating information on four sectors, safe driving, operational status, the level of kindness, and vehicle management with the help of approximately 100 monitoring members through the "Agenda and Meetings for Public Transport in Jeonju" (http://bus.green21.or.kr/) (see Table 2). The results are collected to create an analytical report and utilized to help establish policy in Jeonju for bus enterprises.

Table 2. Evaluation Items of City Buses According to the Jeonju Monitoring Group

Description	Evaluation item
Safe driving	Sudden departure, sudden braking, sudden change of lane, start driving while car door open, speeding, wild driving, and violation of traffic regulations
Operational status	Failure to stop, suspension of service, adequacy of route signs, and adequacy of automatic guidance announcements
Level of kindness	Attitude to passengers' questions, driving attitude (whether using mobile phone), driver's attire, and consideration for vulnerable traffic
Vehicle management	Status of heating, cooling and ventilation, vehicle's external cleanliness, vehicle's internal cleanliness, damage to internal facilities, and checks on the availability of major facilities

Daegu also makes an effort to improve its bus service by evaluating the kindness of drivers, failure to stop, violation of traffic signals, speeding, wild driving, safety, guidance announcements, and the status of facilities inside the buses. To achieve this, Daegu has 300 monitoring group members with three for each city bus route (www.dgag21.or.kr). In

Gwangju, 180 monitoring group members check 2018 drivers and 910 vehicles. Drivers and bus companies can receive strong penalties depending on the results of evaluations (www.gwangju.go.kr). After giving several warnings, Gwangju has a regulation that enables the city to stop drivers and bus companies from operating, suspend them, and dismiss them.

2.2. The 4Ps Concept and the Use of a Citizen Monitoring Group for the City Bus Service in Daejeon

In order to improve a public transport system, the level of service should be maintained or enhanced. To do this, and as part of the process of investigating the service satisfaction level among public transport users, this paper introduces the example of Daejeon, where a systematic operation is conducted using the 4Ps concept.

The citizen monitoring group of the city bus service in Daejeon established a plan for public transport service improvement together with the users and introduced the 4Ps concept. In addition, evaluation items and their weights were determined by the monitoring group in order to secure a fair evaluation process. The results obtained from the service satisfaction investigation on the city bus service are incorporated into the following year's policy by the city authorities. This approach enhances public transport by improving the service for city bus users and modifying the evaluation items.

First, according to the activities and function of each participant body supporting the citizen monitoring group of the city bus service in Daejeon, municipalities (public) have provided a free transfer and sharing system to the other means of transportation (metro, bicycle, etc.) in order to enhance public transport. They have also introduced a Bus Quasi-Public Operating System in order to provide a low-price transport service to citizens through administrative and financial support. In addition, bus companies (private) regularly conduct training for bus driving and control, ensure their drivers act with kindness and drive safely, and act upon complaints notified by the investigation into the satisfaction level of the service. People act as members of the monitoring group for the city bus service and as users at the same time. Civil society (in the case of Daejeon, this is represented by the Daejeon council of 21 members) selects the city bus monitoring group and supports its activities. The council has a critical supervisory role with the citizen monitoring group (see Figure 1).

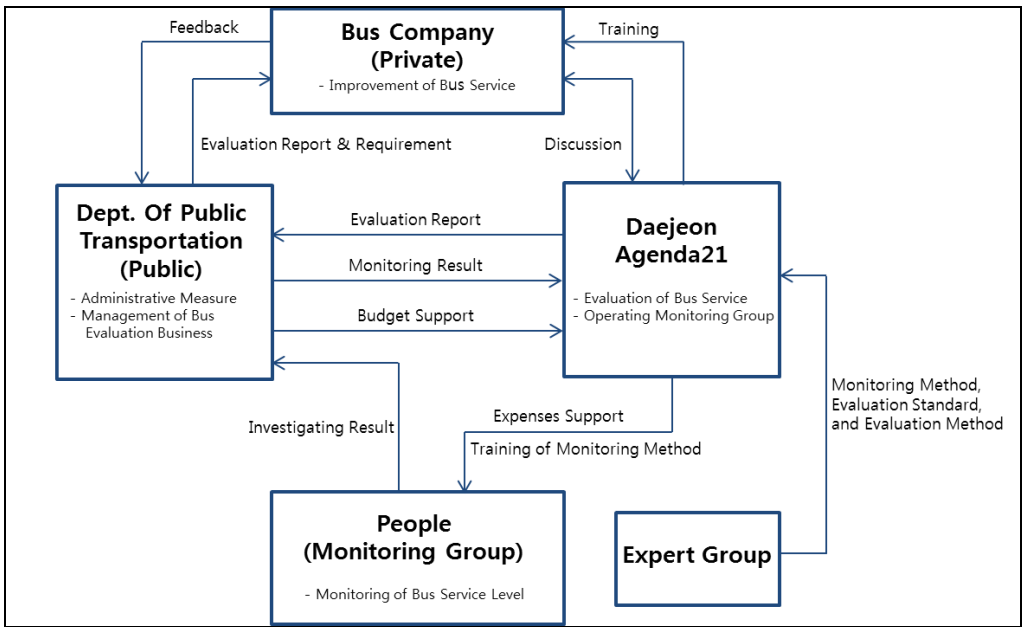

Figure 1. A Conceptual Representation of the 4Ps Model

The main bodies of the 4Ps model are civil society, representing citizens and the public transport department, and the labor union that represents the drivers of the bus companies (Figure 2). In order to evaluate the service fairly, an advisory group composed of professors, researchers, public service managers, broadcasters, and civil society representatives is in charge of the selection of the evaluation standards and the determination of the weights for each standard.

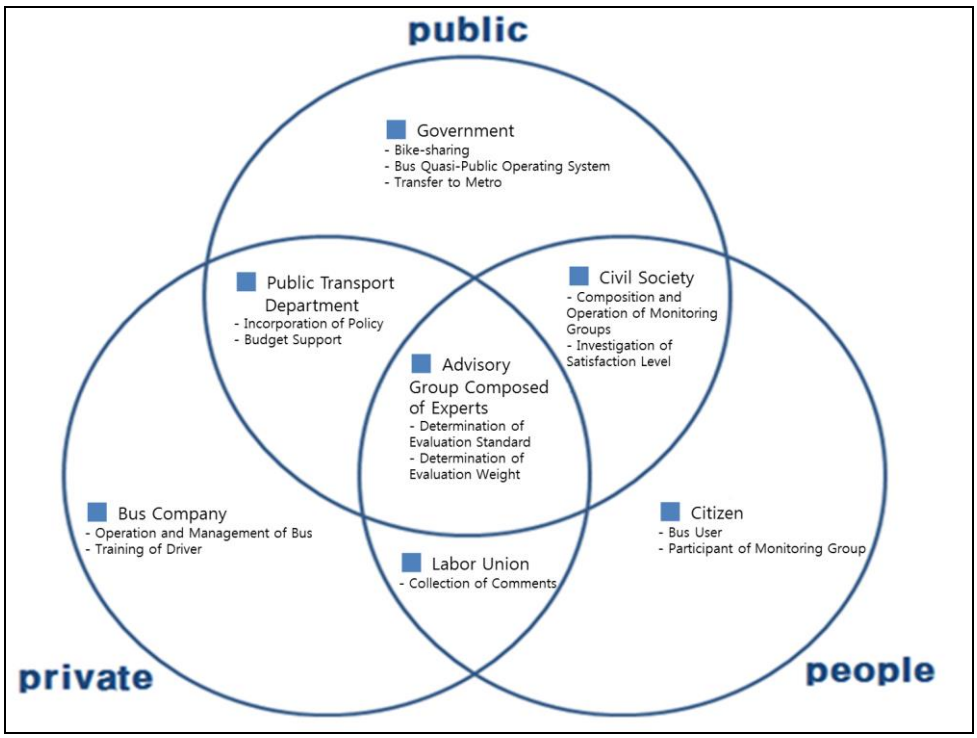

Figure 2. Interrelationships of the 4Ps Model in the Public Transit Service

Daejeon has operated the citizen monitoring group for its bus service since 2008. Information for over 20,000 events, including complaints and compliments, has been evaluated and uploaded by approximately 250 monitoring members every year. The aims of the monitoring group are to identify kind drivers and companies that provide a high quality service and compliment them. A further aim is to establish the effect on service improvement with regard to all of the bus companies and transport-related organizations and people. Some of the individual citizen monitoring groups in each route evaluate the use of buses from January to December every year and also consider in detail the drivers, the circumstances of use, and operational status as follows.

· Driver: evaluation of attire, kindness, and driving attitude.

· Circumstances of use: guidance announcements, cleanliness, noise, route signs, and status of facility management.

· Status of operation: evaluation of sudden departure, sudden braking, and wild driving.

Evaluation items have been almost the same every year and the scores (the weights of the evaluations) have not changed significantly. However, the evaluation items have largely improved through the deliberation of the expert advisory group by deleting items or reducing scores. In particular, because the items for drivers' attire and greeting level for passengers were recently improved, issues that accounted for high weights when initially introduced in 2008, their scores have reduced. According to the detailed evaluation items in 2012, 40 scores for safe driving, 20 for kindness, 20 for the guidance system, and 20

for vehicle control have been distributed. In addition, a recently introduced item considers whether drivers give a ride to passengers to the bus bay for their convenience and safety.

Table 3. Evaluation Items and Scores of the Daejeon City Bus Service

Classification	Evaluation item	Score
Safe operation and its status (40)	Sudden departure, sudden braking, and sudden change of lane	10
	Unnecessary use of klaxon, speeding, and wild driving	10
	Level of stopping at bus stop (failure to stop and avoiding access to bus bay)	10
	Attitude of driving (use of mobile phone)	10
Kindness (20)	General kindness (route guidance, consideration for the elderly, passenger movement and getting off, and uncouth expression)	10
	Drivers' attire (uniform and tidy image)	5
	Greeting for passengers	5
Guidance system (20)	Adequacy of guidance announcements at bus stops	10
	Adequacy of guidance signs (normality of route and LED guidance panel)	5
	Status of driver's tablet and preparation of postcard to report inconvenience	5
Vehicle management (20)	Condition of internal vehicle (seat, window, lighting, bell for getting off, advertisement, bus strap, and floor)	10
	Vehicle's external cleanliness	5
	Status of heating, cooling, and ventilating system	5
Total		100

Therefore, it is considered that Daejeon has continuously and systematically supported the monitoring groups since 2008 in order to boost public transport and improve the city's bus and traffic service. Daejeon has acted creatively, used a knowledge base that includes experts, and incorporated the results of the evaluations into its policy.

3. Analysis of Service Satisfaction by Monitoring

3.1. Confirmation of Arriving on Time

Among the evaluation items in 2012, the results for the question about the bus arriving on time showed that 48% of respondents answered "arrived exactly on time" and "arrived on time" and 36% answered "general." The remaining 16% answered "not arrived on time." With regard to the reason why the service interval between each bus was not regularly maintained, 46% of respondents selected "traffic congestion" as the main reason

and the others chose "insufficient number of vehicles," "inconformity to vehicle allocation interval," and "illegal parking" in that order (see Figure 3).

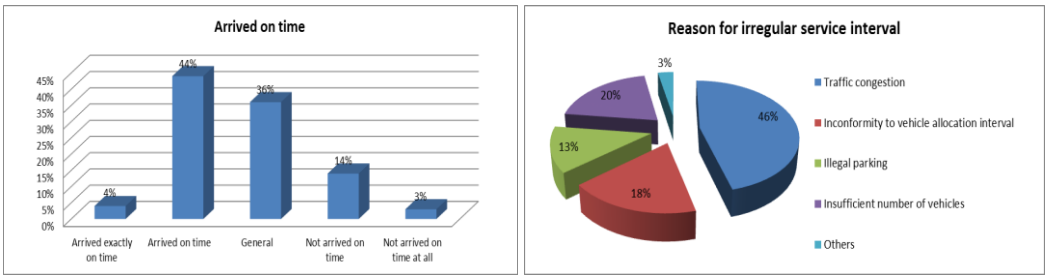

Figure 3. Arrival of the City Buses on Time and the Reason for Irregular Service Intervals

3.2. Drivers' Status and City Bus Satisfaction Level

With regard to the comments about consideration for passengers, greeting, and attitude, 38% of respondents answered "very kind" and " kind," which is a 2% increase compared with the prior year (36%). With regard to conforming to the driving speed, departure and stopping protocol, traffic regulations, *etc.*, 38% answered "very satisfied" and " satisfied," which is an 8% increase compared with the prior year. With regard to issues that should be improved by drivers concerning their driving status, 28% selected "required to be improved because respondents are uncomfortable with a sudden start" and 14% referred to incorrect halts at a bus bay, and violation of traffic signals and stop lines (see Figures 4 and 5).

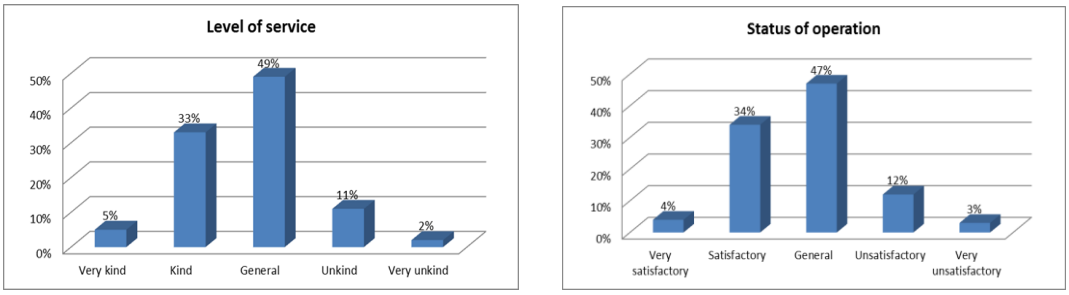

Figure 4. Satisfaction Evaluation Results of Level of Service and Status of Operation

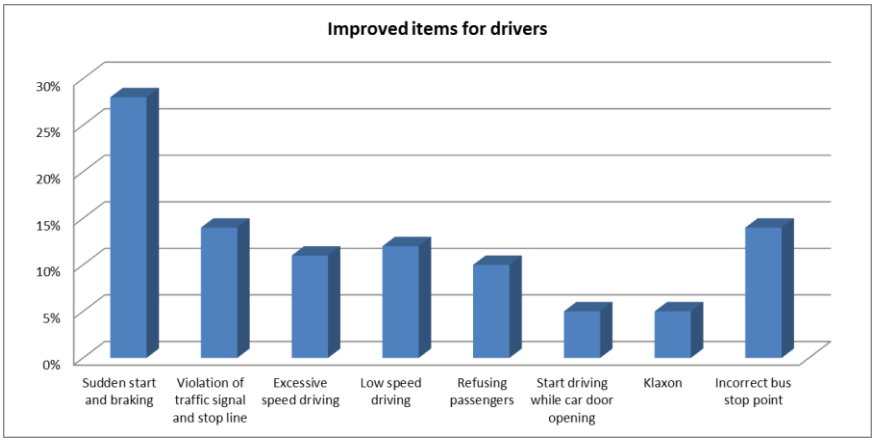

Figure 5. Improved Items for Drivers

3.3. Items to be improved

With regard to the issues to be improved for city bus services, 18% of respondents answered "long waiting times," which was the highest level. 15% answered "irregular operation intervals" and 13% referred to "unkind drivers" and "wild and excessive speed driving" as issues to be improved (see Figure 6). Even though 18% of respondents selected "long waiting times" as an item to be improved, this was significantly better than the 2010 figure of 37.70%. In addition, "irregular operation intervals" improved from 35.6% in 2010 to 15% in 2012. All the items to be improved for city bus services in 2012 had clearly become better compared with the percentages in 2010.

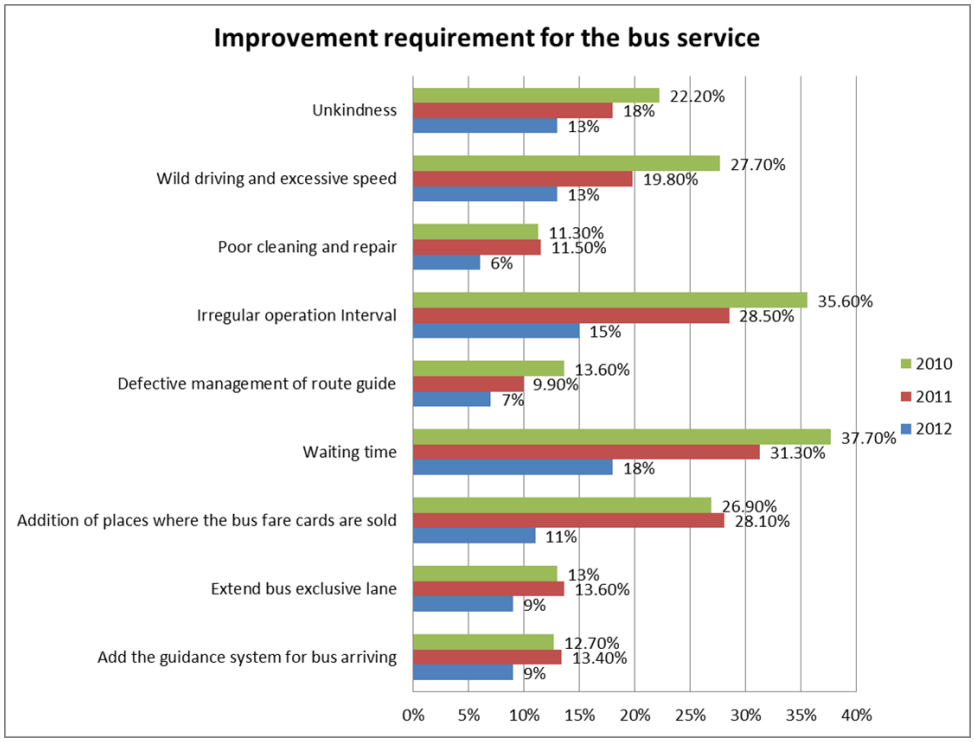

Figure 6. Improvement Requirement for the Bus Service

3.4. Statistical Comparison of Improvement of the Bus Service for each Question

The Bonferroni method was used to resolve multiple comparison problems and tested whether the improvement of the bus service from 2010 to 2012 for each question is statistically significant. The mean differences were compared for nine questions (see Figure 6). The null hypothesis is that the mean differences of the items to be improved are the same for each year, as follows.

$$H_0 : \mu_{2010} = \mu_{2011} = \mu_{2012}$$

$$H_1 : not \quad H_0$$

where

μ_{2010} : Mean differences of items to be improved in 2010

μ_{2011} : Mean differences of items to be improved in 2011

μ_{2012} : Mean differences of items to be improved in 2012

The values for the Bonferroni test for the mean differences for each year were mostly more than the critical values at the 95% confidence level. This means that the bus service can be assumed to have continuously improved every year. Even though some items such as cleanliness, fare cards, bus lane, and arrival system were not statistically significant for annual comparison, these items in 2012 were clearly statistically significant compared with each question in 2010. Table 4 shows the statistical results of the comparisons for 2010, 2011, and 2012.

Table 4. Descriptive Statistics for Each Year

		N	Mean	Std. Deviation	Std. Error	95% confidence interval		Min. value	Max. value
						Lower bound	Upper bound		
Unkindness	2010	140	.2352	.07476	.00632	.2227	.2477	.03	.45
	2011	140	.1841	.07732	.00653	.1712	.1970	-.03	.39
	2012	140	.1372	.07752	.00655	.1242	.1501	-.07	.34
	Sum	420	.1855	.08625	.00421	.1772	.1938	-.07	.45
Excessive Speed	2010	140	.2712	.08158	.00689	.2576	.2848	.04	.46
	2011	140	.1919	.07671	.00648	.1791	.2047	.03	.44
	2012	140	.1331	.08123	.00687	.1196	.1467	-.16	.31
	Sum	420	.1987	.09776	.00477	.1894	.2081	-.16	.46
Cleanliness	2010	140	.1123	.07692	.00650	.0994	.1251	-.12	.31
	2011	140	.1138	.08541	.00722	.0995	.1281	-.13	.39
	2012	140	.0499	.07967	.00673	.0366	.0632	-.17	.27
	Sum	420	.0920	.08589	.00419	.0838	.1002	-.17	.39
Operational Interval	2010	140	.3520	.07665	.00648	.3392	.3648	.17	.55
	2011	140	.2676	.08385	.00709	.2536	.2816	-.01	.44
	2012	140	.1385	.08141	.00688	.1249	.1521	-.07	.33
	Sum	420	.2527	.11918	.00582	.2413	.2641	-.07	.55
Route Guidance	2010	140	.1455	.07448	.00629	.1331	.1580	-.05	.34
	2011	140	.0914	.08025	.00678	.0780	.1048	-.15	.30
	2012	140	.0641	.07474	.00632	.0516	.0766	-.11	.28
	Sum	420	.1003	.08353	.00408	.0923	.1084	-.15	.34
Waiting Time	2010	140	.3774	.05746	.00486	.3678	.3870	.19	.52
	2011	140	.3191	.05212	.00440	.3104	.3278	.15	.44
	2012	140	.1736	.04906	.00415	.1654	.1818	.03	.28
	Sum	420	.2900	.10077	.00492	.2804	.2997	.03	.52
Fare Cards	2010	140	.2699	.08579	.00725	.2555	.2842	.05	.49
	2011	140	.2709	.07806	.00660	.2579	.2840	.11	.50
	2012	140	.1070	.08031	.00679	.0936	.1204	-.07	.28

	Sum	420	.2159	.11203	.00547	.2052	.2267	-.07	.50
Bus Lane	2010	140	.1289	.05517	.00466	.1197	.1381	.00	.30
	2011	140	.1364	.04988	.00422	.1281	.1447	-.04	.27
	2012	140	.0920	.04715	.00398	.0841	.0998	-.06	.19
	Sum	420	.1191	.05432	.00265	.1139	.1243	-.06	.30
Arrival System	2010	140	.1206	.08019	.00678	.1072	.1340	-.07	.33
	2011	140	.1282	.08055	.00681	.1148	.1417	-.12	.32
	2012	140	.0783	.07672	.00648	.0654	.0911	-.10	.29
	Sum	420	.1090	.08199	.00400	.1012	.1169	-.12	.33

Table 5. Bonferroni Pairwise Comparisons

	(I) Years	(J) Years	Mean difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Unkindness	2010	2011	.05115*	.00915	.000	.0292	.0731
		2012	.09808*	.00915	.000	.0761	.1201
	2011	2010	-.05115*	.00915	.000	-.0731	-.0292
		2012	.04693*	.00915	.000	.0249	.0689
	2012	2010	-.09808*	.00915	.000	-.1201	-.0761
		2011	-.04693*	.00915	.000	-.0689	-.0249
Excessive Speed	2010	2011	.07929*	.00955	.000	.0563	.1022
		2012	.13808*	.00955	.000	.1151	.1610
	2011	2010	-.07929*	.00955	.000	-.1022	-.0563
		2012	.05879*	.00955	.000	.0358	.0817
	2012	2010	-.13808*	.00955	.000	-.1610	-.1151
		2011	-.05879*	.00955	.000	-.0817	-.0358
Cleanliness	2010	2011	-.00154	.00965	1.000	-.0247	.0217
		2012	.06236*	.00965	.000	.0392	.0856
	2011	2010	.00154	.00965	1.000	-.0217	.0247
		2012	.06390*	.00965	.000	.0407	.0871
	2012	2010	-.06236*	.00965	.000	-.0856	-.0392
		2011	-.06390*	.00965	.000	-.0871	-.0407
Operational Interval	2010	2011	.08442*	.00964	.000	.0612	.1076
		2012	.21348*	.00964	.000	.1903	.2367
	2011	2010	-.08442*	.00964	.000	-.1076	-.0612
		2012	.12906*	.00964	.000	.1059	.1522
	2012	2010	-.21348*	.00964	.000	-.2367	-.1903
		2011	-.12906*	.00964	.000	-.1522	-.1059
Route Guidance	2010	2011	.05413*	.00915	.000	.0321	.0761
		2012	.08140*	.00915	.000	.0594	.1034
	2011	2010	-.05413*	.00915	.000	-.0761	-.0321
		2012	.02727*	.00915	.009	.0053	.0493
	2012	2010	-.08140*	.00915	.000	-.1034	-.0594
		2011	-.02727*	.00915	.009	-.0493	-.0053
Waiting Time	2010	2011	.05826*	.00633	.000	.0430	.0735
		2012	.20376*	.00633	.000	.1885	.2190

	2011	2010	-.05826*	.00633	.000	-.0735	-.0430
		2012	.14550*	.00633	.000	.1303	.1607
	2012	2010	-.20376*	.00633	.000	-.2190	-.1885
		2011	-.14550*	.00633	.000	-.1607	-.1303
Fare Cards	2010	2011	-.00106	.00974	1.000	-.0245	.0223
		2012	.16287*	.00974	.000	.1395	.1863
	2011	2010	.00106	.00974	1.000	-.0223	.0245
		2012	.16392*	.00974	.000	.1405	.1873
	2012	2010	-.16287*	.00974	.000	-.1863	-.1395
		2011	-.16392*	.00974	.000	-.1873	-.1405
Bus Lane	2010	2011	-.00749	.00608	.655	-.0221	.0071
		2012	.03693*	.00608	.000	.0223	.0515
	2011	2010	.00749	.00608	.655	-.0071	.0221
		2012	.04442*	.00608	.000	.0298	.0590
	2012	2010	-.03693*	.00608	.000	-.0515	-.0223
		2011	-.04442*	.00608	.000	-.0590	-.0298
Arrival System	2010	2011	-.00759	.00946	1.000	-.0303	.0152
		2012	.04237*	.00946	.000	.0196	.0651
	2011	2010	.00759	.00946	1.000	-.0152	.0303
		2012	.04996*	.00946	.000	.0272	.0727
	2012	2010	-.04237*	.00946	.000	-.0651	-.0196
		2011	-.04996*	.00946	.000	-.0727	-.0272

4. Conclusion and Future Study

This study introduced the elements of an innovative strategy to improve the city bus service in Daejeon using the 4Ps concept and boost public transport. The strategy is based on the civil participation model and has organized civil monitoring groups for the city bus service since 2008, thereby improving the service and encouraging the use of public transport. The strategy's outcome and efforts have been taken into consideration in this paper.

With regard to the general satisfaction level of citizens for the city bus service in Daejeon Metropolitan City in 2012, 67% of respondents answered "very satisfied" and "satisfied," 27% answered "so-so," and 5% said "unsatisfied" and "very unsatisfied." It is considered that most Daejeon citizens have a positive attitude toward the general service provided by the city buses in Daejeon. With regard to the improvement of the city bus service since 2008 when civil monitoring groups began monitoring, positive answers have increased as follows: 39.4% in 2008, 50.3% in 2009, 55% in 2010, and 59.8% in 2011. These percentages show rapidly increasing value.

The efforts to cooperate made by Daejeon city, bus companies, and citizens have brought positive general recognition of the city bus service. In addition, the complaints registered on the internet through the civil monitoring group have been incorporated into policy or otherwise acted upon to ensure an improvement structure with a virtuous cycle. Further, other municipalities benchmark the experience and efforts in Daejeon for their own civil monitoring groups and city bus services. Thus, it is necessary to construct traffic services creatively based on knowledge and experience, and also enable organizations to develop methods of public transport support.

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