

Survey on the Public Transport Needs of Persons with Disabilities



Professor John BACON-SHONE Director Social Sciences Research Centre,

The University of Hong Kong

Survey on the Public Transport Needs of Persons with Disabilities

- Section One: Travel Characteristics and Travel expenditure Incurred
- Section Two: Fare Concession Impact
- Section Three: Conclusion of the Survey

Section One: Travel Characteristics and Travel expenditure Incurred

- Background Information
- Personal Information
- Travel Characteristics
- Travel expenditure Incurred
- Weekly total travel expenditure per PWD
- Limitations

- The Social Sciences Research Centre (SSRC) of The University of Hong Kong was commissioned by the Health Welfare and Food Bureau of the HKSAR Government to conduct a sample survey to assess the traveling characteristics and to estimate the travel expenditures of the Persons with Disabilities (PWDs) who are the recipients of Disability Allowance (DA) or Comprehensive Social Security Assistance (CSSA) with 100% loss in earning capacity.
- Survey data were collected through telephone interviews and faceto-face interviews from 7th September to 16th October 2006.

- The main objectives of the survey were:
 - To estimate the travel expenditures of the PWDs for each public transport mode.
 - □ To identify the general travel behaviour of the target respondents.
 - To evaluate the factors affecting choice of public transport mode by PWDs.
 - □ To understand the likely impact of concessionary fares.
- Information from the respondents about their traveling characteristics including purpose, origins and destinations, mode of transportations used and the impact of different possible concessions was enumerated.
- Demographic information such as age, working or studying status, personal and household income was also collected during the interviews.

PWDs are defined as those who have <u>AT LEAST ONE</u> of the following conditions:

Physical handicap (PH)

□ Visual impairment (VI)

Hearing impairment (HI)

□ Speech impairment (SI)

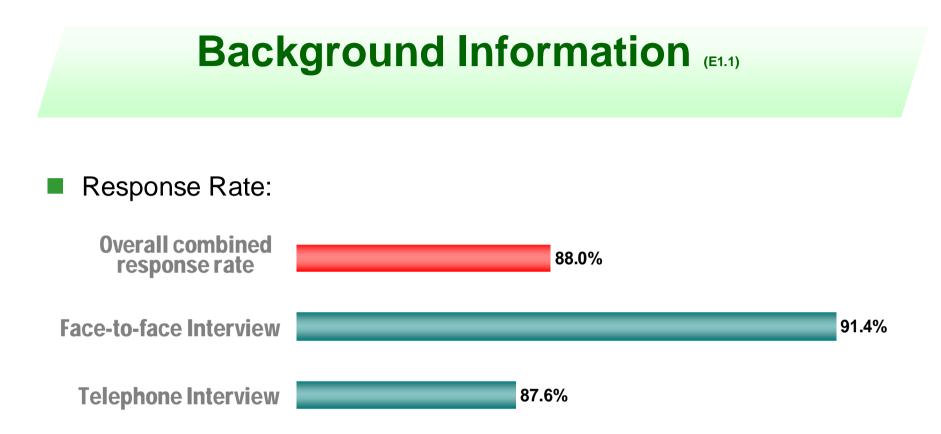
Mental illness (MI)

Autism[1]

Mental handicap (MH)

[1] Autism PWDs are grouped with Mental Illness (MI) in this survey.

- The target respondents were the PWDs <u>Aged between 12 and 65</u>, classified into the following categories:
 - Recipients of Normal Disability Allowance (NDA) and Higher Disability Allowance (HDA).
 - Recipients of Comprehensive Social Security Assistance (CSSA) receiving the standard rates for those 100% disabled or requiring constant attendance in institutions or the community.

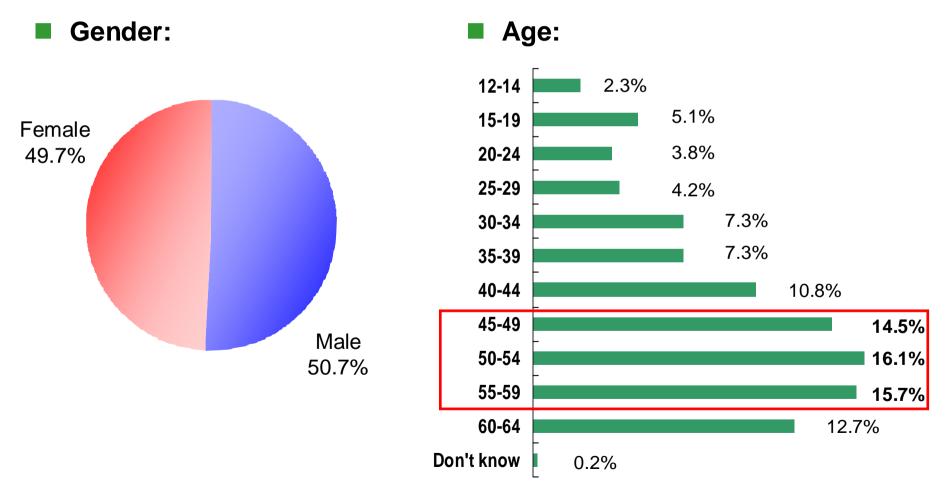


A total of 84,595 PWDs in the target categories were identified by the Social Welfare Department and all the estimates and tables presented are weighted according to the respective PWD population, except the table showing the sampling of the surveyed PWDs.

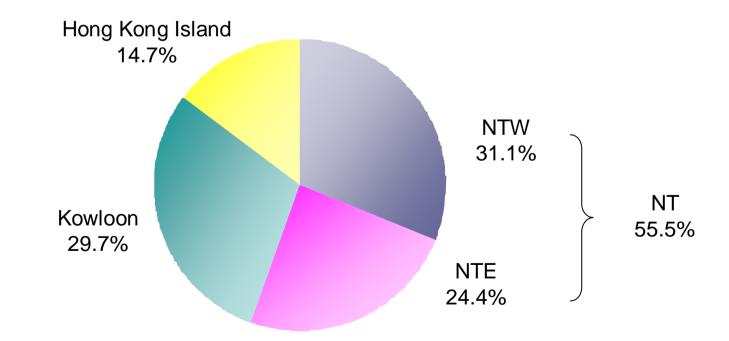
In this survey, 1,977 interviews were completed by the PWDs and the remaining 1,183 interviews were completed by their carer[2] who takes care of the respondents' daily life.

[2] The carer who answered the questionnaire may not be the person who accompanies the PWD for traveling.

HKU, SSRC



Nearly ten percent of the respondents were living in Tuen Mun (9.6%) and another 9.5% living in Yuen Long, which were the two largest groups. Only 1.3% of them were living in Wan Chai and 1.2% were living in Islands.



At the beginning of the questionnaire, respondents were asked to define their disability types and the kind of allowance currently received[3]

[3] Self-defined disability status and types of allowance receiving reported by the PWDs. Multiple responses allowed.

Self-reporte	d Disability
VI	7.4%
HI	9.7%
МН	12.6%
SI	7.2%
Autism	1.9%
МІ	43.7%
PH	45.2%
Others	0.2%

Self-reported	Allowance		
CSSA	36.9%		
DA	66.5%		
Don't know	0.6%	N	
		Normal DA	90.2%
		Higher DA	8.7%
		Don't know	1.1%

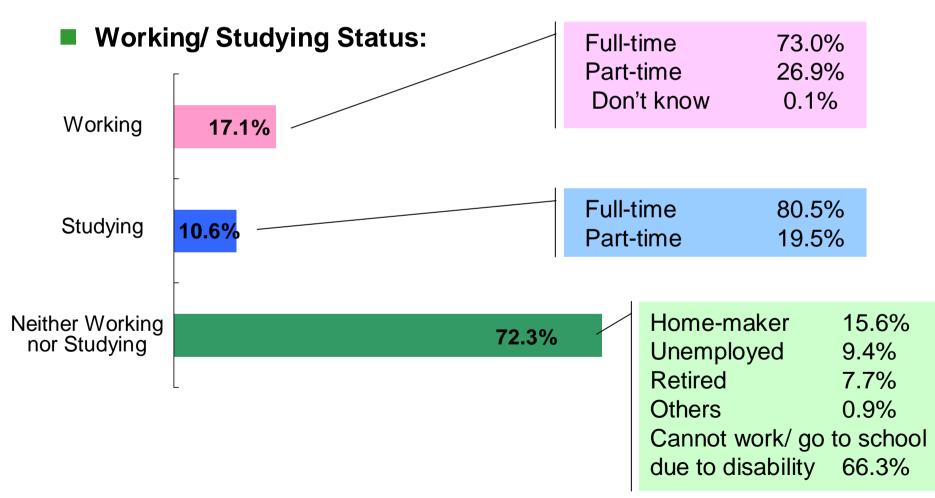
The following table summarizes the overall number of successful interviews by combined type of disability and financial support (type of disability and financial support of the surveyed PWD refers to the database provided by SWD rather than the self-reported status):

Disability	Overall	CSSA: 100% disabled		CSSA: constant attendance		DA	
		Institution	Community	Institution	Community	Higher	Normal
VI	8.6% (273)	-	0.1% (4)	-	-	0.4% (14)	8.1% (255)
н	8.3% (261)	0.3% (8)	2.2% (71)	-	-	-	5.8% (182)
MI	30.7% (971)	7.9% (250)	8.9% (281)	0.9% (29)	0.7% (21)	1.6% (52)	10.7% (338)
МН	7.4% (233)	0.3% (8)	0.3% (8)	0.0% (1)	-	2.8% (88)	4.1% (128)
РН	45.0% (1422)	3.4% (108)	6.3% (201)	2.7% (88)	5.5% (171)	13.7% (426)	13.5% (428)
Total	100.0% (3160)	11.8% (374)	17.9% (565)	3.7% (118)	6.1% (192)	18.4% (580)	42.1% (1331)

* Note: Small groups were OVER-SAMPLED.

- One of the major concerns was that the PWDs who had hearing impairment or mental handicap needed to be handled with great care from the process of obtaining consent to the data collection process. The particular difficulty of obtaining consent for the respondents who had hearing impairment was noticed at the stage of contacting the PWDs to ask for their agreement before the commencement of the project. The number of successful interviewed hearing impairment cases was only 260 out of a total of 3,160 cases.
- Applying post-stratified weighting to the data should have minimized the effect of contact problems in particular disability groups.

HKU, SSRC



- Only 1.4% of the surveyed PWDs owned at least one vehicle. Amongst the 46 surveyed vehicle owners, 41.7% of them have a disabled person parking permit.
- Only 1.5% of the surveyed PWDs said that they will drive when go out.
- A quarter of the respondents reported the need for mobility aids when traveling (23.1%):

Type(s) of Aids Needed (multiple	responses)	
Electrical Wheelchair	4.3%	Wheelchair
Manual Wheelchair	34.2% -	38.5%
Crutches (for VI)	4.6%	
Crutches (for PH)	47.6%	
Walking Aid (for PH)	5.6%	
Hearing Aid	12.0%	
Others	8.3%	

HKU, SSRC

Personal Information (E1.2)

Personal Monthly Income:

Family Monthly Income:

<4,000	T.	73.8% <4,000	۲ 		21.6%
4,001-5,000	3.4%	4,001-5,000		5.7%	
5,001-6,000	2.8%	5,001-6,000		6.1%	
6,001-7,000	1.5%	6,001-7,000		4.9%	
7,001-8,000	1.3%	7,001-8,000		6.0%	
8,001-9,000	0.8%	8,001-9,000		5.1%	
9,001-10,000	0.8%	9,001-10,000		4.7%	
>\$10,000	2.1%	>\$10,000			24.5%
Refuse	0.8%	Refuse		1.9%	
Don't know	3.1%	Don't know			19.3%
N/A	9.7%	N/A	0.2%		

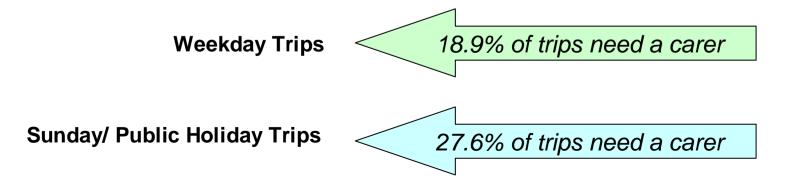
Travel Characteristics (E1.3, 1.4, 1.5)

- The surveyed PWDs were asked about their trips (where "Trip" means a journey with a main purpose and a single destination which can consist of several sub-trips) made the weekday and Sunday/public holiday before being interviewed including all the characteristics such as the main purpose of the trips, frequency of making trips etc.
- After that, details of each sub-trip (where "Sub-trip" means a single journey on one mode of transport) were recorded including the time taken, starting point and destination, mode of transport used and the reasons for using that transport mode.
- Some of the trip or sub-trip information was lost if the interviews were completed by the carers. For example, the trip purposes, reasons for choosing particular mode of transport or the length of the sub-trips often could not be answered by carers.

HKU, SSRC

Travel Characteristics (E1.3, 1.4, 1.5)

- Near half of the respondents were traveling within the New Territories. 50.8% of the weekday trips and 50.2% of the Sunday or public holiday trips started in the New Territories. Eastern District, Yuen Long, Tuen Mun, Kwai Tsing and Sha Tin were the most popular districts during the last weekday, Sunday or public holiday.
- More trips made during Sunday or public holiday involved carers[4] accompanying the surveyed PWDs than for weekday trips.
 [4] "Carer" refers to a person who accompanies the PWD for traveling on public transport.



Travel Characteristics (E1.3, 1.4, 1.5)

The trip purposes for weekday and Sunday or public holiday had some similarities and some differences.

Trip Purpose	Weekday	Sunday/Public Holiday
Go Home	43.4%	42.0%
Social/Recreational activities	13.0%	16.8%
Handling Daily living matters	12.8%	14.8%
Go to work/ school	12.6%	4.1%
Receiving Healthcare	4.3%	1.1%
Relaxation/Exercise	3.0%	2.7%
Personal Issues	2.7%	1.2%
Leisure/volunteering activities	1.6%	10.0%
Functions arranged by Organizations	1.5%	6.8%
Attend job training/classes	0.4%	0.3%

Travel Characteristics (E1.3, 1.4, 1.5)

- Reasons for selecting the transport mode were reported by the respondents for weekday and Sunday or public holiday trips, which are mainly convenience of alighting locations, the only choice around the starting point and convenience of boarding locations with efficiency added for KCR, MTR and taxi, cost for tram and ferry and special facilities for Rehabus.
- Whether weekday or Sunday/public holiday has little effect on the respondents' choice of transport mode.

Weekday Trips: A total of 3,384 trips (7,962 sub-trips) were made by the 3,160 respondents who reported their trips on the last weekday (from Monday to Saturday), 41.7% of them made at least one trip on that day. Amongst the respondents, one-fifth of them traveled by bus (20.2%), 9.3% by GMB and 7.5% by other vehicles[5]. According to the average amount spent per respondent during weekdays, \$2.3 was spent on bus, which is the highest amongst other modes of transport.

[5] "Other vehicles" included Red minibus, Resident shuttle bus, Private car, Company or school bus etc.

Some estimates include estimated travel for the carers, which may be significantly under or overestimated. This is because we assumed that carers paid the same amount as PWDs on trips where the PWDs reported needing a carer.

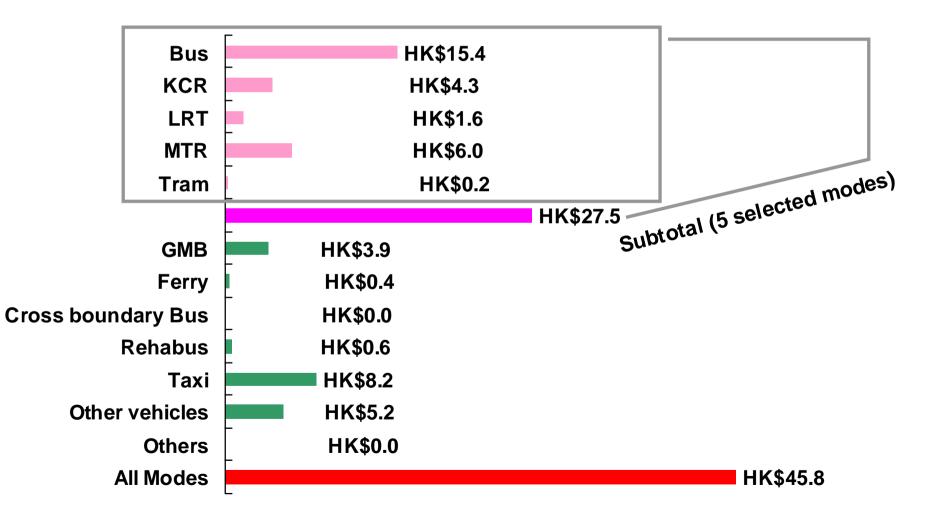
Weekday Trips:	Sub-trips	% of population who are users	Travel exp. (exclude carer) per PWD (mean)	Travel exp. (include carer) per PWD (mean)	Travel exp. per user (mean)
Bus	1,268	20.24	2.3	2.7	11.5
KCR	240	4.23	0.6	0.7	15.1
LRT	232	3.67	0.2	0.3	6.7
MTR	434	7.69	0.9	1.0	11.9
Tram	62	1.12	0.0	0.0	3.5
Subtotal (the 5 selected modes)	2,235	30.46	4.2	4.8	13.7
Franchised Minibus (Green)	490	9.30	0.6	0.7	6.3
Ferry	13	0.36	0.0	0.0	12.4
Cross boundary Bus	0	0.00	0.0	0.0	0.0
Rehabus	35	0.50	0.1	0.2	17.2
Taxi	105	2.37	1.2	1.2	49.0
Other vehicles	431	7.54	0.8	1.2	10.7
Others	4,652	39.32	0.0	0.0	0.0
All Modes	7,962	41.69	6.9	8.0	16.5

Sunday/ Public Holiday Trips: A total of 1,940 trips (5,288 subtrips) were made by the respondents who reported their trips on the last Sunday or public holiday (28.3% of the respondents made at least one trip during the last Sunday or public holiday). Slightly less than one-sixth of them traveled by bus (13.7%), 6.3% by GMB and 5.7% by other vehicles. The average traveling expenditure per PWD was \$4.4 (\$1.6 was spent on the bus).

Sunday/Public Holiday Trips:	Sub-trips	% of population who are users	Travel exp. (exclude carer) per PWD (mean)	Travel exp. (include carer) per PWD (mean)	Travel exp. per user (mean)
Bus	844	13.72	1.6	2.0	11.4
KCR	185	3.56	0.5	0.7	14.5
LRT	128	2.17	0.1	0.2	6.6
MTR	254	4.59	0.6	0.7	12.1
Tram	28	0.55	0.0	0.0	3.0
Subtotal (the 5 selected modes)	1,439	19.90	2.8	3.6	14.1
Franchised Minibus (Green)	318	6.28	0.4	0.5	6.4
Ferry	21	0.47	0.1	0.1	16.0
Cross boundary Bus	0	0.00	0.0	0.0	0.0
Rehabus	7	0.19	0.0	0.0	7.8
Taxi	94	1.84	0.8	0.9	46.0
Other vehicles	327	5.66	0.3	0.4	4.4
Others	3,082	26.89	0.0	0.0	0.0
All Modes	5,288	28.30	4.4	5.4	15.5

PWDs had higher average traveling expenditure on the last weekday (\$6.9) than on the last Sunday or public holiday (\$4.4).

The average weekly total expenditure on all modes of public transport per PWD is \$45.8. The respondents spent \$15.4 on buses (\$11.1 spent on KMB on average), followed by \$8.2 on taxis and \$5.2 on other vehicles. For the five selected transport modes (bus, KCR, LRT, MTR and tram), \$27.5 was spent on the five modes in total per week.



Respondents who had visual impairment (\$57.0) or mental handicap (\$52.3) spent slightly more than the respondents with other disability types on traveling. Respondents who had visual or hearing impairment spent more on bus, KCR, LRT, MTR and tram, with an amount of \$44.3 and \$41.1 respectively, than on other transport modes. Respondents who did not have a physical handicap spent a significant proportion of their travel expenses on bus, while the respondents who had a physical handicap spent substantially more on taxis (\$11.5) than the other respondents.

Respondents receiving Normal DA (\$31.4) spent more on trips using the five selected modes than the respondents receiving Higher DA (\$14.5). The respondents receiving CSSA living in institution only spent \$5.9 on average on bus, KCR, LRT, MTR and tram per week, which is the lowest amongst the expenditures within the six allowance groups. Concerning the total weekly travel expenses, respondents receiving CSSA and living in an institution only spent \$16.2 per week, which is significantly less than CSSA recipients living in the community (\$40.7).

Section Two: Fare Concession Impact

- Background Information
- Limitations
- Fare Concession Impact by Transport Modes
- Estimated Expenditure per PWD after Concession
- Reasons for No Increase in Using Public Transport with Concession
- Cashflow and Revenue Forgone under the Impact of Fare Concession

- Before the commencement of the survey, members of the LegCo Subcommittee to Study the Transport Needs of and Provision of Concessionary Public Transport Fares for Persons with Disabilities (the Subcommittee) requested the administration to consult the disabled community and public transport operators about providing fare concessions to the PWDs, including two railway corporations, the franchised bus companies and tram operator. The five modes of bus, KCR, LRT, MTR and tram were selected and listed in the questions related to hypothetical fare concession.
- The requirement was specified in the third Subcommittee Meeting of the Legislative Council to Study the Transport Needs of and Provision of Concessionary Public Transport Fares for Persons with Disabilities meeting held on 16 February 2006.

At the Subcommittee meetings on 10 July 2006, Members of the Subcommittee requested that the survey should include questions to assess how PWDs would change their use of public transport services, particularly the additional trips that would be made, if fare concessions were provided on the above five modes. Having regard to Subcommittee members' request, hypothetical questions were included in the questionnaire to ask respondents to estimate their change in public transport usage or expenditure on buses, MTR, LCR, LRT and tram if 50% fare concession for PWDs were provided on Sunday/public holiday only, during non-peak hours on all days or whole day throughout the year.

Limitations (E2.2)

- The answers to all the hypothetical questions can only be used as a reference, as the answers of the surveyed PWDs cannot be tested until a real fare concession comes into effect.
- General difficulties in answering hypothetical questions were noted during the survey. The surveyed PWDs generally found it quite difficult to answer the percentage increase in use of a mode of transport under different hypothetical concessions even if they were a current user of that mode of transport. They found it even more difficult to estimate their likely weekly expenditure of modes of transport that they are not current users of, under the hypothetical concessions. The missing values affect the estimation of the cashflow and the revenue forgone, so alternative estimation methods were introduced.

Limitations (E2.2)

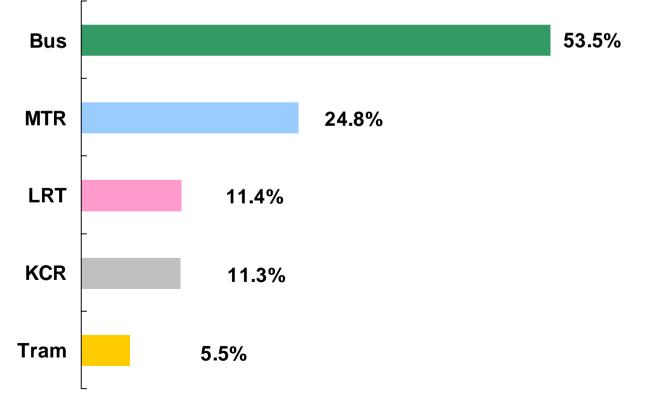
[con't] For the percentage increases, the mean increase for those who could answer this question was used to impute the missing increase for those who could not answer. This is reasonable as it automatically scales current use. For new customers, the missing amount of weekly expenditure was estimated in two different ways. Firstly, we estimated using the mean amount for new customers who could estimate expenditure, which should be an upper bound on expenditure. Secondly, we assumed that new customers who could not estimate the amount would spend very little, so we estimated zero weekly expenditure. This should serve as a lower bound for estimated expenditure.

Limitations (E2.2)

- It was not practical to assess substitutional effects (i.e. any decrease in use of one transport mode as a result of increase in other modes, so the estimates may show a positive bias as a result, although the major substitution effect is likely to be on modes without concession).
- Citybus offers a 50% full-day concession to passengers aged over 60 years. This is implicitly accounted for by asking for the respondents about actual expenses. However, it was not explicitly taken into account for the questions on possible new concessions which imply that there is an additional concession, however only 3 respondents were in this situation. The same situation exists for PWDs who enjoyed other concessions now, such as the student 50% full-day concession when using the MTR (there are 52 respondents in this situation).

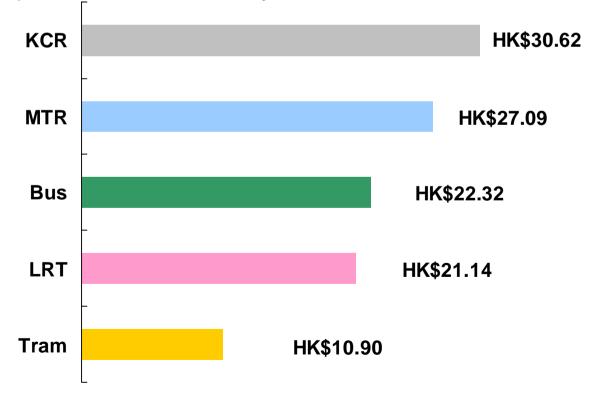
- The meaning of <u>Existing customer</u> was those who usually use particular transport modes at least once a week.
- Meaning of <u>New customer</u> was those who would start to use a particular transport mode under hypothetical fare concession.

Existing Customers: Based on the responses from the surveyed PWDs, amongst those five transport modes, the bus was leading in the proportion of <u>Existing Customers</u>:



- An average increase of more than 100% in trips for existing customers was reported for the MTR and KCR under full day fare concession, 103.57% and 101.52% were reported respectively.
- Increases in trips for existing customers were also recorded for the bus (72.41%), LRT (70.33%) and tram (69.96%). But the increases were not as large as those for the KCR and MTR.

New Customers: Amongst the <u>New Customers</u> who could estimate the weekly expected amount to be spent on a particular mode of transport under the full day fare concession:



More than one-third of respondents not usually using MTR would consider using it under the full day concession (37.80%, comprising 28.43% of the total population), followed closely by bus (32.40%, comprising 15.07% of the total population), and KCR (30.40%, comprising 26.96% of the total population).



Estimated Expenditure per PWD after Concession (E2.5)

- The surveyed PWDs were asked to estimate the amount they expect to spend under 50% fare concessions for three different timeslots (Sundays & Public Holidays, Off-peak and full day) on the five selected transport modes. The total weekly transport expenditure for the selected modes (MTR, KCR, LRT, Bus & Tram) per PWD is estimated as \$27.53 with no concession, \$39.66 under the public holiday concession and \$43.8 under the full day concession.
- However, the increase is due to new customers, as the figures allowing only for the increase in use for existing customers are \$26.30 under the public holiday concession and \$19.94 under the full day concession.

Reasons for no increase in using public transport with concessions (E2.6)

- The main reasons for not using the selected modes of transport were very similar, the most common reason was that they rarely or no need to travel by it, followed by no service to the respondents' destination and depending on whether they need to use it.
- Also, a significant proportion of respondents claimed that they rarely or never go out was their reason for not using transport even with concessions.
- It is noteworthy that after concessions, very few PWDs report that fares restrict them from using any of the selected modes of transport.

Cashflow and Revenue Forgone under the Impact of Fare Concession (E2.7)

- The estimated <u>Weekly Cashflow</u> presents the difference in monetary terms between the weekly revenue of particular transport operator under the different 50% fare concessions (when taking into account the usage of potential new customers under concession and the increased usage by the existing customers under concession) and the normal fare.
- Negative Cashflow implies the increased customers and usage after concession are unable to cover the decrease in cashflow due to the 50% concession offered when compared with normal fare.
- Positive Cashflow implies that more money can be earned under fare concession when compared with normal fare.

Cashflow and Revenue Forgone under the Impact of Fare Concession (E2.7)

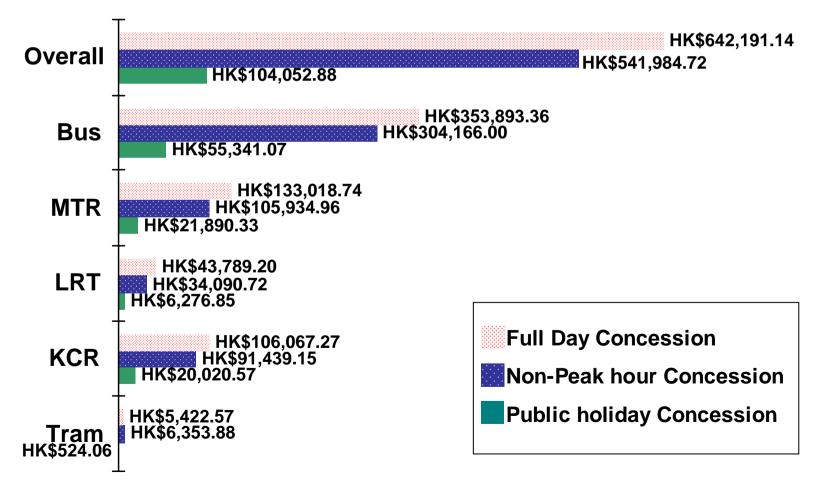
- The <u>Weekly Revenue Forgone</u> presents the figures from a different angle. After taking into account the usage of potential new customers under concession and the increased usage by the existing customers under concession, the revenue forgone presents the difference between the normal fare and the fare under 50% concession.
- That is, how much money will NOT be received because of the 50% concession by each transport operator.

Cashflow and Revenue Forgone under the Impact of Fare Concession: Excluding New Customers (E2.8)

- Excluding the new customers who claimed that they would start to use a particular mode of transport under fare concession, the Overall Weekly Cashflow for the five selected modes recorded a <u>REDUCTION</u>, ranging from \$104,052.88 (public holiday concession) to \$642,191.14 (full day concession).
- The maximum Weekly Revenue Forgone estimated for the five selected modes ranged from \$192,216.98 (public holiday concession) to \$1,686,673.26 (full day concession).

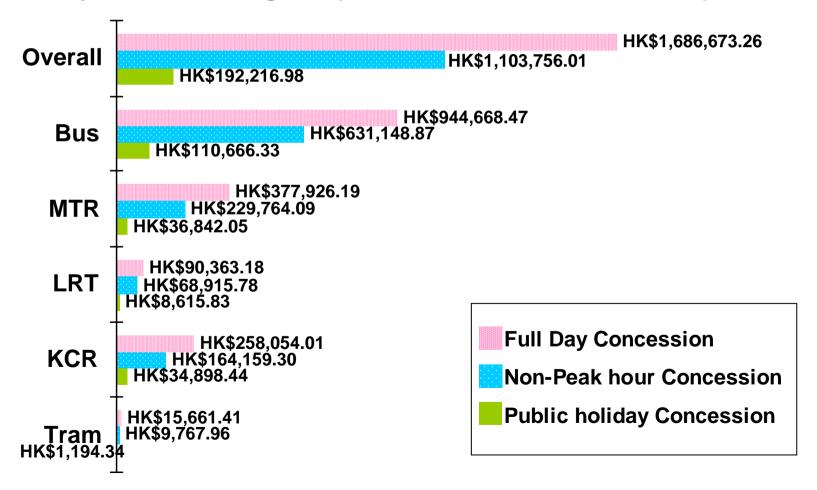
Cashflow and Revenue Forgone under the Impact of Fare Concession: Excluding New Customers (E2.8)

Weekly Reduced Cashflow (EXCLUDING new customers):



Cashflow and Revenue Forgone under the Impact of Fare Concession: Excluding New Customers (E2.8)

Weekly Revenue Forgone (EXCLUDING new customers):

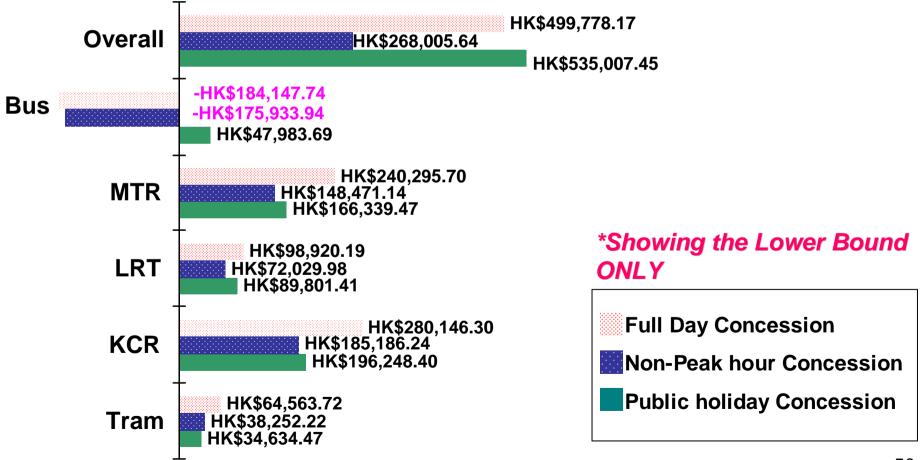


Cashflow and Revenue Forgone under the Impact of Fare Concession: Including New Customers (E2.9)

- Taking into account all the five transport modes and including all the new customers under concession, the full day fare concession is estimated to result in the greatest overall <u>INCREASE</u> in Weekly Cashflow. The increases in overall weekly cashflow under the full day fare concession ranged from \$499,778.17 to \$1,378,495.91.
- The estimated maximum Weekly Revenue Forgone under full day concession ranged from \$2,828,642.57 to \$3,707,360.32 including new customers.

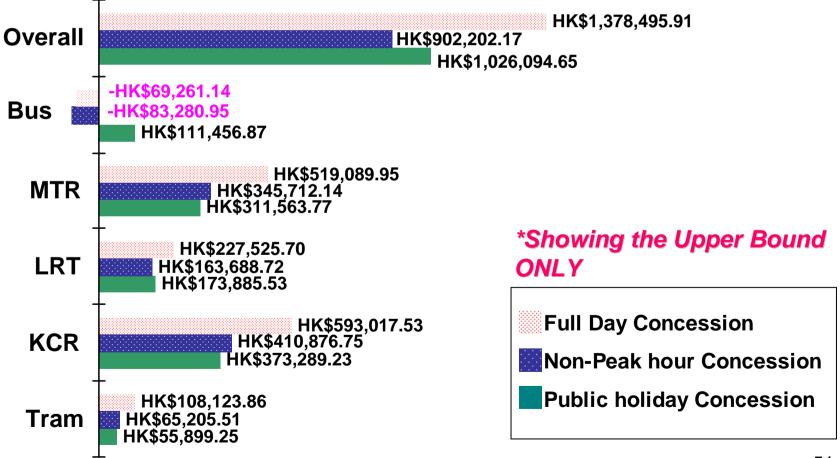
Cashflow and Revenue Forgone under the Impact of Fare Concession: Including New Customers (E2.9)

Weekly Increased Cashflow* (INCLUDING new customers):



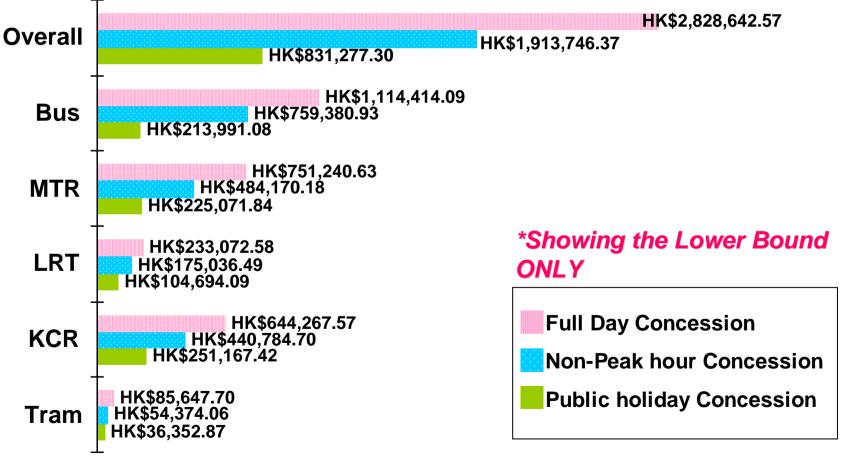
Cashflow and Revenue Forgone under the Impact of Fare Concession: Including New Customers (E2.9)

Weekly Increased Cashflow* (INCLUDING new customers):



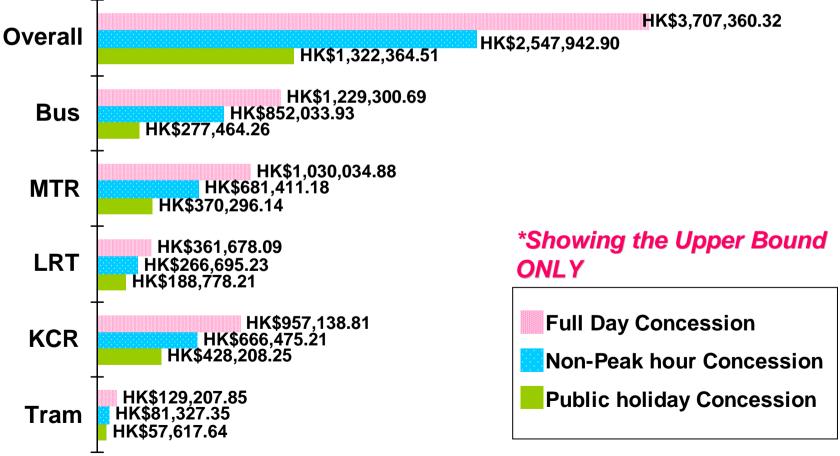
Cashflow and Revenue Forgone under the Impact of Fare Concession: Including New Customers (E2.9)

Weekly Revenue Forgone* (INCLUDING new customers):



Cashflow and Revenue Forgone under the Impact of Fare Concession: Including New Customers (E2.9)

Weekly Revenue Forgone* (INCLUDING new customers):



Section Three: Conclusion (E3.1, 3.2)

- The average weekly total expenditure on all modes of public transport per PWD is \$45.8. The respondents spent \$15.4 on buses (\$11.1 spent on KMB on average), followed by \$8.2 on taxis and \$5.2 on other vehicles. For the five selected transport modes (bus, KCR, LRT, MTR and tram), \$27.5 was spent on the five modes in total per week.
- To summarize the factors affecting the choice of transport modes, convenience of alighting locations, the only choice around the starting point and convenience of boarding locations were the three main reasons for choosing most of the transport modes with efficiency added for KCR, MTR and taxi, cost for tram and ferry and special facilities for Rehabus.

Section Three: Conclusion (E3.3)

The main reasons for not using the selected modes of transport were very similar, the most common reason was that they rarely or no need to travel by it, followed by no service to the respondents' destination and depending on whether they need to use it. Also, a significant proportion of respondents claimed that they rarely or never go out was their reason for not using transport even with concessions. It is noteworthy that after concessions, very few PWDs report that fares restrict them from using any of the selected modes of transport.

Section Three: Conclusion (E3.4)

From the respondents' responses to the above questions, cost was not the most important factor affecting the choices of transport, as other reasons such as the convenience of alighting or choices available around the starting point are more important. However, under the hypothetical 50% fare concession, existing customers were stimulated to increase use, while other PWDs were stimulated to start using particular transport modes. Caution is necessary, though, as the answers to the hypothetical questions and the estimated change in revenue can only serve as a reference. Respondents may have expressed an interest in using the transport modes under fare concession without careful consideration of all the implications, such as the increased expenditure by any carers needed.

Section Three: Conclusion (E3.5)

Under different fare concession options, that is, public holiday concession, non-peak hour concession (hours except Mon-Fri 700am-930am, 500pm-800pm & Sat 700am-930am) and full day concession, the total weekly expenditure per PWD on MTR, KCR, LRT and tram is found to increase. The total weekly expenditure per PWD on buses was estimated to increase only under public holiday concession. While the increase in weekly expenditure per PWD is not evenly spread across the five transport modes, with the major increases being for the MTR and KCR.

Section Three: Conclusion (E3.6)

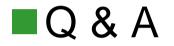
There were increases in weekly cashflow in MTR, KCR, LRT and tram including all the new users under concessions. However, because half of the respondents were already existing bus users, the proportion of new users and the expected amount spent by them were relatively small, leading to a net reduction in weekly cashflow under the non-peak hour concession and full day fare concession.

Section Three: Conclusion (E3.7)

The overall estimated weekly expenditure for bus, MTR, KCR, LRT and tram combined per PWD under concession ranges from \$33.44 to \$43.82. While it is hard to validate these estimates directly, some reference can be made to the current weekly travel expenditure across all transport modes per PWD of \$45.8 and across the five selected modes of \$27.53. Thus, while there is a significant increase in estimated total expenditure for the five selected modes, if there is some substitution of transport modes without concession by modes with concession, then the total expenditure across all modes may not be too different before and after concessions, suggesting that the estimates of expenditure under concession have at least some face validity.

HKU, SSRC

End of Presentation



60