COMPARATIVE STUDY OF URBAN MOBILITY IN SUB-SAHARAN AND ASIAN CITIES: ISSUES AND PRIORITIES IN POLICY FORMULATION

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Abstract

The major objective of this paper is to cross compare the mobility trends of a target group, the poor inactive, in varying sociocultural and economic environments offered in two cities in different continents, Chandigarh, in India, and Ouagadougou, in Burkina Faso. The analysis show that the higher mobility levels in Ouagadougou compared to Chandigarh are mostly due to transport related factors as well as sociocultural factors. This paper points out two main conclusions. First, for the inactive poor population a more coherent and integrated development of urban infrastructure would be perhaps more helpful to resolve the issues of inequity and immobility than the mere provision of public transport. Second, data collection and storage methodologies must not be lost of sight while making international comparaisons.

INTRODUCTION

Equity should be a major objective in the delivery of infrastructural facilities in developing countries. Several countries in Asia and Africa are currently experiencing shifts of population from rural to urban areas, in search of economic opportunities for improving their quality of life. Transport services in Asian and African cities are provided by a wide range of modes, which are most often demand responsive but vary in respect of quality, quantity, speeds and price to meet the increasing demands of travel. They thus do not meet the generalised objectives of equal access to opportunities. These are resulting into situations where urban poor or dependant population with no or low incomes are deprived of transport services thus making societies more inequities.

The canvas of urban mobility research has covered a large ground in rapidly developing countries of Asia, Africa and Latin American countries as a part of the ongoing studies towards improving transport, assessment of non motorised transports and their role in cities, specific research studies focusing upon activity and mobility patterns, etc. Most studies have largely confined themselves towards arriving at case specific solutions within their domain. However, very little evidence is available to suggest whether policy interventions, social and cultural impacts on lifestyles of populations, geographical settings, and transport systems and their development policies have any bearing upon the mobility pattern. The major objective of this paper is to cross compare the mobility trends of a target group placed in varying sociocultural and economic environments offered in two different countries. Another point of interest in developing this paper is the identification of methodological issues and areas that need further investigations to make international comparisons more meaningful.

Mobility is understood and defined in several ways, however, most researchers and users of urban transport have defined it as the ease of travel, i.e. the number of trips an individual makes in a day, in availing economic and social opportunities provided by the city. Several authors (Fouracre *et al*, 1987; Ranganathan *et al*, 1988) have successfully demonstrated that mobility levels within Indian cities are highly structured and influenced by location, gender, occupational status, etc. Similar studies in sub-Saharan cities of Bamako and Ouagadougou have reported these same findings and have proved that household composition and task distribution within the household, access to a personal vehicle, and working schedules are equally important determinants in urban mobility (Diaz Olvera *et al*, 1996; Diaz Olvera *et al*, 1996). The inferences and answers arrived at by different researchers thus argue for a multisectoral approach of mobility and set up a wider canvas for searching global and integrated policy initiatives towards appreciating and resolving mobility issues which may relate to specific target groups, urban societies, cities or countries.

AVAILABLE DATA

A large number of cities in Asia and Africa are in the process of developing transport plans and policies through reasonably well organised transport studies. Data in respect of several recently surveyed Indian cities and two African cities were accessible for appreciating the similarities and variations in mobility. The available data sets, city characteristics, location and social and economic life styles of population were understood and appreciated to select two cities for a paired comparison of mobility trends in representative cities of Africa and Asian regions. The comparative studies on data resulted in the following observations.

Whilst the data for Indian cities have been drawn from conventional travel demand surveys currently undertaken for improving the public transport infrastructure, the data for Ouagadougou and Bamako have emerged from the mobility studies undertaken by LET and other French and African

institutions since 1992 (Diaz Olvera *et al*, 1993; Pochet *et al*, 1995). The questionnaire designs in African context were more comprehensive from the point of mobility interest as several aspects such as current housing, life style, expenditure on acquisition and use of personal vehicles and attitudinal studies were included. In both cases, surveys were carried out by trained investigators who were supervised and field checked.

The procedure of travel surveys were similar to the extent that they represent the previous day travel pattern but there were conceptual variations in the data collection methods and storage. Indian studies captured the principal household and trip characteristics in all the traffic zones, against the zonal typologies and random sample selection approach in the African cities. Similarly, in the African surveys, the problems associated with defining a trip and their intermediate purposes have been a point of major concern, particularly in respect of short distance trips. Additionally, from mobility considerations there are possibilities that short distance intra-zonal trips may not get reported in the data collected for Indian cities as they are more directed towards assessing the macro-level demand. Furthermore, the coverage of the population with respect to age was different in the two cities. Whilst the African mobility studies targeted population aged 14 years and above the demand studies undertaken in Indian cities covered the total population.

Subject to the above variations in data sets, the comparative analysis of the city characteristics was undertaken to arrive at a most comparable pair of cities. The introspection suggested that two cities of Chandigarh and Ouagadougou form the most acceptable pairs for comparative studies as the other cities exhibit a wide variation in city sizes and functions and may involve the interplay of several other parameters which may be difficult to control for arriving at meaningful conclusions.

PRINCIPAL CHARACTERISTICS OF INDIAN AND SUB-SAHARAN CITIES

The comparative appreciation of the mobility characteristics commence with the appreciation of the macro socio-economic domain in which the two cities are located (Table 1).

Table 1 - Economic trends and urbanisation in case countries

Indicator	India	Burkina Faso
Size (km^2)	3 300 000	274 000
Population (10^6)	936 [1991]	10.2 [1985]
Growth rate (%)	1.9	2.8
Urban population (%)	27	27
GDP ($ per inhabitant)	300	300

India, which enjoys the status of a subcontinent, is nearly twelve times the size of Burkina in area and more than ninety times bigger than its counterpart in respect of population. However, what is interesting are the similarities in other macro-economic indicators, such as share of urban population, GDP per capita and city characteristics which have a more pronounced impact on travel rather than the size considerations of the countries.

General characteristics of Chandigarh and Ouagadougou

Chandigarh is one of the planned cities of India. Initially designed as the capital of undivided Punjab, the status of Chandigarh changed in 1966 due to the reorganisation of the state of Punjab into Haryana and Punjab. Currently Chandigarh enjoys the status of a union territory and houses the capital functions of both Punjab and Haryana states. Chandigarh, which was originally designed for 0.15 million people, has rapidly grown to its current size.

The city is expected to achieve the metropolitan status by the turn of the century. The design of Chandigarh was conceived on a sectoral approach. A total of 47 sectors were designed to accommodate the planned population of 0.5 million, however on account of several factors the city has to meet the needs of a much larger set of population thus resulting into several distortions in travel pattern. The public transport system of Chandigarh is not well developed. The state owned Chandigarh transport union currently operates about 100 buses in the city. The services are unreliable and inadequate to meet the demand thus resulting into high dependency on paratransit and private modes of transport.

Like other cities of developing countries, Ouagadougou is experiencing an explosive growth. Its population increased from 0.06 million inhabitants in 1962 to 0.44 million in 1985 and in the early nineties it was estimated to range between 0.7 and 0.8 million (Jaglin, 1995).

The recent revolutionary period (1983-1987) left a marked impression on the spatial structure of the city and its impacts were significant for the transport sector (Beeker et al, 1994; Jaglin, 1995). In order to restrict the influence of the traditional chiefs, a new spatial and administrative division of the city, made up of 30 zones, was adopted. The implementation of the new urban development scheme resulted in the large scale relocation of inhabitants from the dense central areas to the periphery of the city, the rehabilitation of the central areas and the legalisation of the existing « spontaneous » settlements in the periphery. The first company for public transport was created in 1984. Working within a favourable environment due to the total lack of public and private competitors, the initial years were promising. Subsequently, the degradation of the operating environment, the freezing of the fares by the government, and the lack of subsidies induced a chronic deficiency and loss of patronage, a phenomenon currently observed in other cities of developing countries. Thus the population of Ouagadougou depends on walking or the use of a personal vehicle, mostly two-wheelers, for those who can afford it.

The comparative study of the general characteristics of Chandigarh and Ouagadougou (Table 2) reflect marked similarities in respect of their city functions and their high rates of population growth.

Table 2 - Characteristics of case cities

Indicator	Chanlgarh	Ouagadougou
City size (10^3 inhab.)	642 [1991]	700-800 [1992]
Growth rate (%)	8.1	9.4
Study area (km^2)	115	220
Density (per/km^2)	5631	3600

Even if their spatial development is different, Chandigarh being significantly more dense than Ouagadougou, similarities may be observed in respect of their public transport inputs and trends in usage of private transport. However, there are some variations in the socio-economic characteristics of population, such as household size, income level, vehicle ownership, etc. which are likely to influence the mobility patterns of the two population sets under study.

General characteristics of the household survey samples

As indicated above, the methodology used for the data collection was quite different in each city. In Chandigarh, the entire urban area was subdivided into 100 zones and a sample of five or six households from each zone was selected on a random basis. In Ouagadougou, through a typology of the 30 administrative zones of the city, 10 were selected for the survey. The number of households inquired in each zone was proportional to its population and like in Chandigarh, they were selected on a random basis. At Chandigarh, the final sample contains 590 households and 2650 respondents and at Ouagadougou, 753 households and 3682 respondents of 14 years old and over.

The sampled populations of the two cities were compared in respect of the indicators which could be constructed with a fair degree of accuracy (Table 3). Several interesting inferences are available from the comparisons, for example, the average household size is markedly different. Whilst Chandigarh represents a city where nuclear families predominate, the city of Ouagadougou represents a society where joint family systems form the societal backbone.

Table 3 - Characteristics of sample population in case cities

Indicator	Chandigarh	Ouagadougou
1. No of households	590	753
2. Size of household (n° of persons)	4.5	7.8
3. No of respondents	2650	3682
a) Male (%)	53.4	53.9
b) Female (%)	46.6	46.1
4. Age of respondents (%)		
a) below 10 years	14.3	-
b) 10-60 years	80.2	96.9*
c) above 60 years	5.5	3.1
5. Literates (%)	94.3	74.6
6. Earners (%)	34.2	40.7
7. Occupational groups (%)		
a) Service	25.1	23.4
b) Primary and labourers	1.32	1.8
c) Business	9.20	15.5
d) Students	35.5	30.1
e) Housewives, retired and unemployed	28.9	29.1
8. Income level		
a) Low (%)	28.9	81.0**
b) Medium (%)	64.7	-
c) High (%)	6.4	19.0
9. No of driver licensees (%)	28.3	13.2
a) Males (%)	82.0	79.9
b) Females (%)	18.0	20.1
10. No of vehicles/household	1.6	2.5
No of vehicles excluding bicycles/household	1.1	1.8

* Due to the survey methodology, this value refers to the 14-60 years old population only.
** In Ouagadougou, many respondents refused to furnish their income. To overcome, at least partially, the effects of this missing information, other data of the survey were closely analysed and they allowed to classify the whole set of respondents in two groups: « poor » (81%) and « other than poor » (19%). In order to improve fluency in this paper, the latter are also referred to as « rich ».

There are some marked variations in the literacy levels, the share of earners and their occupational groups which need to be borne in mind whilst comparing the data sets emerging from different countries as they reflect more on the sociocultural factors of the society and their influences on urban styles and travel. Chandigarh, with a higher literacy level in comparison to Ouagadougou, has a lower share in respect of earners. Analysing more closely the occupational character of the population, it is observed that business and education have a trade off amongst each other in the two cities, thus reflecting the priorities of the two societies.

As regards income is concerned, the distribution in real terms is incomparable because of the stratification approaches adopted in the data compilation stages. However, the population in Chandigarh is skewed more heavily towards the lower and middle income groups. Comparatively, the share of the poor in Ouagadougou seems to be lower than in Chandigarh.

In respect of the driving capabilities of the population, the share of the driving population in Chandigarh is more than twice the percentage observed in Ouagadougou. Thus, in Chandigarh there exists on the average 1.3 driving licensees per household while in Ouagadougou this figure is only 0.6. However, in both cities the percentage distribution of driving licenses between males and females is very similar and female licensees are by far outnumbered by males.

Since the role of public transport is negligible, private transport plays a significant role in the two cities. The vehicle ownership level in Ouagadougou is 1.5 times higher than in Chandigarh.

MOBILITY IN CASE CITIES

Aggregate comparisons

The paired study of mobility level has been done at both aggregate and disaggregate levels to appreciate and identify areas of concern and interventions in case cities. The aggregate mobility levels in the two cities significantly vary, the mobility levels in Ouagadougou (3.7 trips) are three times higher in relation to Chandigarh (1.2 trips). However, on discounting the short distance trips in Ouagadougou the variation in mobility levels is reduced to 2.3.

Further comparisons reflect that whilst the share of return trips was similar in the two cities, the purpose wise comparisons of one way trips reflect significant variations in travel pattern of the two cities (Table 4).

Table 4 - Purpose wise distribution of trips in case cities (%)

Purpose of Trips	Chandigarh	Ouagadougou
Work and education	51.0	22.6
Social activities	1.3	18.4
Shopping	0.3	15.2
Return	47.4	43.9

Whilst the mobility levels in Chandigarh are dominated by work and education trips, in Ouagadougou the principal purposes are still work and education but the share of social activities and shopping are quite considerable. It must be observed that to make comparisons with Chandigarh more meaningful, even if the short trips are segregated (and which could be expected to be more related to social and shopping activities) this travel pattern remains stable as the share of work and education increases only slightly up to 25.2%.

The impact of the skeletal public transport services in the urban mobility is fairly limited in Chandigarh and almost non-existent in Ouagadougou, and walk and personal vehicles are predominant in the modal distribution (Figure 1). Whilst in Chandigarh the modal distribution is diversified with walk, cycles and mopeds accounting for 75% of trips (mopeds being the principal mode with 30% of trips), in Ouagadougou only two modes, walk and mopeds, size up 80% of trips. Walk occupies the first place with 42% of trips but the segregation of short trips brings it to the second rang (37%) and mopeds to the first one (42%).
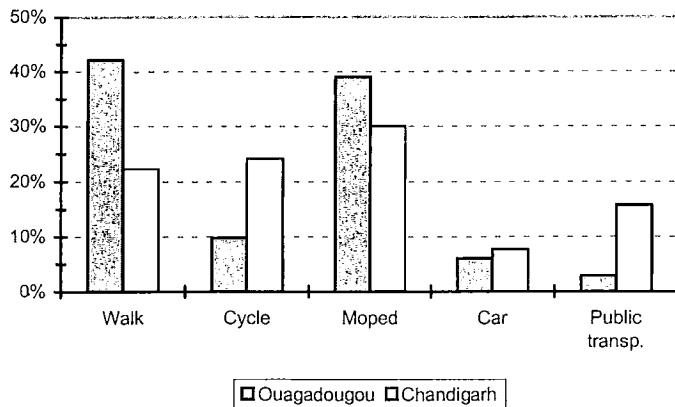
Figure 1 - Modal distribution of trips (%)

Disaggregate analysis

Aggregate comparisons of mobility do suggest the interplay of personal attributes and sociocultural influences on mobility and desire for a disaggregated analysis of mobility characteristics. Several alternatives and options at the macro level were analysed towards building the typologies that could enable more definitive linkages between city, society and individuals observed at aggregate levels. Another important dimension in building the typologies was who suffers the most in cities which do not have well developed urban infrastructure in general and transport in particular?

Based upon the above considerations it was decided to compare and decipher the mobility characteristics of the inactive population (dependant population not actively engaged in work) in respect of their income classifications and the household status considerations. The inactive population was further stratified into four groups of heads of household, housewives, kin (mostly school going children) and others (other members of the household).

The analysis of the household data reflected that nearly two thirds of the sample population in Chandigarh and 60% in Ouagadougou comprises of the inactive set. As per economic status, inactivity is observed at all levels of income. However, in Chandigarh its share is the highest in the case of lower income groups, its share being 70% in comparison to 59% in the case of higher income groups. Comparatively in Ouagadougou, the share of the inactive population amongst the poor and rich is similar, 60%.

In Chandigarh nearly 93% of the housewives in the lower income groups were observed to be inactive as against 72% in the case of higher income groups. Similarly, whilst there was no inactivity observed in the case of heads of household of higher incomes the level of inactivity rose to about 33% in the case of the lower income group. As regards kin and others are concerned the level of inactivity was uniform across all the income groups.

In Ouagadougou it is also observed, as in Chandigarh, that inactivity is more frequent in the poor groups, except for kin and others, but rates of inactivity are certainly different. Housewives are often engaged in an economic activity and this situation explains why only 58% of housewives of the poor households and 49% of the rich households are inactive. For the heads of household, inactivity is also higher within the poor (29%) than within the rich households (16%). Finally, concerning

inactive kin and other members of the household, their share is more significant in the rich households (78%) than in the poor (69%). In the context of African family and social solidarity, better well-off households can support needs of the inactive population more easily than the poorer households.

Conclusively, the share of inactive population rises with receding incomes and amongst them the share of women subjects rises much faster in the Indian city in comparison to the African counterpart.

Mobility of the inactive population

The mobility levels of the inactive population according to the typology described above is given in Table 5.

Inactive housewives of the lower and middle income households in Chandigarh are twice as immobile as their counterparts in the richer households and thrice as immobile than the average mobility level of women in the city. Similarly the other population comprising of aged and dependants are four times as immobile as their counterparts in the higher income groups and the aged and dependants in higher income groups have the same mobility as the heads of households in the lower income group. Amongst the lower income group the housewives are the poorest followed by others, kin and heads of household in terms of their mobility levels.

Table 5 - Mobility levels of inactive population according to the income level of household (number of trips)

	Heads of household	Housewives	Kin	Others	Total
Chandigarh					
Low income	1.6	0.1	1.4	0.4	0.8
Middle income	--	0.1	1.4	0.4	0.9
High income	--	0.3	1.4	1.6	1.1
Total city average	1.7	0.5	1.5	0.6	1.2
Ouagadougou					
Poor	2.5	2.5	3.8	3.4	3.7
Other than poor	2.4	2.8	4.0	3.8	3.3
Total city average	4.0	2.9	3.8	4.0	3.7

Two mobility levels are observed for the inactive population in Ouagadougou, on the one hand heads of household and wives, who have the lowest mobility, and on the other kin and other members of the household. Thus kin and other members make daily about one more trip than the rest of the inactive population.

Contrary to what one might expect, in both cities, but more specially in Ouagadougou, the impact of the level of income of the household on the mobility level seems to be limited and depending on groups, mobility increases more or less when passing from low to high income level. At first sight it could be very tempting to conclude that the behaviour of inactive population is very similar, whether they belong to a poor household or not. Nevertheless, a deeper comparative analysis of the groups shows that the characteristics of their mobility are different in terms of purpose wise distribution, use of modes and the urban spaces they go into.

In Chandigarh the lower income population is dependant upon walk and bicycle. Nearly 70% of their travel needs are satisfied by these modes and the remaining are distributed over the mopeds and cars (18%) and public transport (12%). Amongst this category, the mobility of the head of

households is predominantly dependant upon bicycle (45%), housewives rely upon walk (35%), kin and others utilise walk (50%) and bicycle (25%) for their urban journeys.

The mobility of the middle income groups in Chandigarh exhibits a shift towards the use of faster modes of travel as the component of cycle and walk reduces to about 50%. The remaining is distributed over mopeds and cars (37%) and public transport (13%). Whilst the heads of household exhibit a high preference for mopeds (50%), housewives and others are dependant upon walk (33%) and the demands of kin are spread over walk, cycle and scooters which account for 80% of their demand.

The role of the slow modes further declines to 30% in the case of higher income groups, the share of mopeds and cars rise to about 50% and dependence on public transport rises to about 20%. In respect of individuals, the preference of the head of household goes in favour of mopeds and cars, housewives depend upon mopeds and walk, and kin's travel demand is uniformly distributed over walk, mopeds and public transport.

It is thus quite evident that the mobility of the poor is restricted by the capacities of non-motorised modes, as faster modes, such as car, mopeds and public transport, are beyond the reach of this group from their household budgetary constraints.

In Ouagadougou, concerning heads of household, the principal differences between groups appear in the modal distribution. Concerning the heads of household, the share of mopeds is very similar for the rich and the poor (41% and 44% of trips, respectively); however, the rich use the car for 34% of their trips and the poor walk for 36% of their trips. For housewives and kin and others, the access to personal vehicles is also higher at the better-off income levels and their share increases, diminishing the trips by walk. Thus, poor housewives walk for 83% of their trips against 61% for the rich housewives, and for kin and other members the share of walk is 58% for the poor and 44% for the rich. The impact of the use of personal vehicles is felt of course in the distances of the trips, so the trend for the poor groups is to remain largely in their neighbourhood while the rich go into more distant places (Diaz Olvera et al, 1997).

In respect of the purpose wise distribution in Ouagadougou, a higher income level alleviates housewives from some household tasks and from the trips related to them. It then results in an increase of social trips (36%) when compared with their poor counterparts (26%). For kin and others, the impact is different, as a higher income level of the household permits them to continue their education beyond the primary level and thus the share of education trips is greater (46%) than for the poor population (39%).

The analysis of the inactive population according to the income level shows that the poor dependant groups in cities of developing countries are less mobile than the rest of the population, this mobility being measured not only by the number of trips but above all by its qualitative characteristics.

MOBILITY OF THE INACTIVE POOR POPULATION

Mobility of the urban poor has been a subject of continuous interest and debate in the cities of the developing countries. However, very little is known whether the mobility levels of individuals falling under these categories are constrained by the infrastructural limitations of the city, their own attributes or societal constraints. Activity based research reported in Indian and African cities (Ranganathan et al, 1988; Diaz Olvera et al, 1997) partially answers the above observation. Activity cycles of individuals in households, particularly inactive women, were observed to be considerably different in comparison to the activity cycles of active groups of the same gender, thus reflecting the influence of personal and societal attributes on mobility rather than infrastructure constraints.

Mobility and the target groups

It is quite evident that the increasing gaps in the supplies of infrastructure in general and transport in particular are more relevant to the urban poor as they have limited financial resources to overcome the limitations exercised by the gaps.

The scale of the target group in both cities is different. In Chandigarh, the current data reflects that one third of the inactive population lies in the poorer sections of the society with no access to transport, except walk. They are essentially confined to their neighbourhoods and thus have limited potentials for exploring the opportunities that their city offers for growth and development.

In Ouagadougou, the part of the poor amongst the inactive population is higher (48%) but the situation in respect to the access to transport is quite different compared to Chandigarh as 25% of individuals have either a moped or a cycle. However, only some of the groups concentrate these vehicles. Thus, 60% of the heads of household and 25% of kin and others have a vehicle but only 9% of housewives. In addition, inequalities also appear concerning the type of vehicle. Amongst individuals having access to a vehicle, 65% of the heads of household have a moped but this figure diminishes to 45% in the case of kin and others and to 35% in the case of wives.

The significant share of access to a private vehicle has of course an impact on the modal distribution. In Ouagadougou, walk is the principal mode, specially for housewives (84% of their trips are made by walk). Nevertheless, with a similar mobility level, heads of household make only 36% of their trips by walk and 44% in mopeds. With much higher mobility levels, the modal distribution of kin and other members is in a middle position as they walk for about 60% of their trips but the use of mopeds and cycles is still significant (22% and 14%, respectively).

In Ouagadougou, the mobility of heads of household and housewives concerns mostly two types of activities, social on the one hand, and shopping and other activities linked with the functioning of the household on the other. However, their weight is extremely different for each group. For heads of household, social trips concern 56% of their mobility and shopping 40%. Housewives, on the contrary, have 72% of their trips related to shopping and household tasks and the rest concerns social activities. Kins and others have a more balanced activity pattern, with shopping activities accounting for 25% of their trips and the rest of their mobility being concerned either by education or by social activities.

A further analysis of the target groups in respect of their socio-economic characteristics thus becomes necessary to search for their linkages with mobility.

Socio-economic and demographic factors

In Chandigarh, about 80% of the heads of household fall into the category of inactive on account of their age as they are more than 50 years old. At this age it is difficult to find gainful economic opportunities. The review of their literacy levels reflects that nearly 40% have primary education and may thus be constrained by qualifications to find economic opportunities. The two cumulatively reflect on their current occupations as 5% have reported their current occupation as household and retired activities and the remaining service (28%) and business (22%), respectively. The set of poor inactive heads of households in Ouagadougou is younger as only 58% are more than 55 years old (56 years old on the average) but illiteracy is more acute as almost half of them have no education at all and they are one third with only primary education.

Inactive and poor housewives are middle aged and literate in Chandigarh, and their counterparts in Ouagadougou are on the contrary younger (36 years old on average) and the three quarts are illiterate.

In respect of kin and other members of the household, business, education and unemployment are the predominant occupations in Chandigarh. They largely fall into an age profile of 20 to 40 years. In Ouagadougou the principal occupation of 60% of this group is education and the rest are unemployed. Thus, only 14% is illiterate and almost 60% has reached the secondary level. As in the case of housewives, kin and others are younger than in the Chandigarh set as they are 95% in the 14-35 years old segment (22 years old on average).

Variations in mobility levels between the two case studies is then partially explained by differences in socio-economic and demographic patterns. It must still be kept in mind that there are strong influences of the methodology used, that is the data collection of short trips in Ouagadougou and not in Chandigarh. Its effect on the inactive population, specially poor, might be greater than for the rest of the population as their mobility takes place mostly in their neighbourhood. Similarly, the influence of the social and cultural context is considerable.

Social and cultural mobility considerations

Whilst there are some similarities in the demographic activity and structural characteristics of the population, there is a marked variation in the mobility levels of the cities. In both cases there is a marked division of labour according to gender that also determines the spaces in which men and women move. Men probe the external environments whereas women stay at home or in the nearby environments. However, two main factors influence the impact of this gender division of labour on mobility and the differentials between the male and female mobility are more apparent in Indian cities than in their counterparts in Africa. The first of these factors is the manner in which informal shopping and trading activities are organised in Indian and African environments. In the Indian cities the shopping by women is largely confined to their doorstep as women largely remain within the limits of their house. The women in African environments largely rely on the corner shops thus resulting in a higher share of movement for meeting their household needs.

The second factor is the significant interplay of social activities in West Africa, where social groups are more monolithic in their character and mutually dependant on each other. Their share in the mobility is thus consequently higher and important. In the case of Chandigarh the society is structured more on the income considerations and the social bonds are not so strong as observed in the African cities thus reflecting a more urban social mix.

Most developing countries see the western societies as a model of economic and social development. However, with these influences permeating the Indian and African environments there are distinct possibilities of further structural adjustments in household functions and divisions of labour. This is already observed in the context of richer households who depict a qualitative and quantitative change in mobility of inactive population in contrast to the inactive poor. It is thus necessary that these changes are understood and appreciated before the efforts to strengthen the urban transport infrastructure are pursued. In order to do so, more comprehensive surveys and studies are necessary.

Implications of infrastructure

The implications of cities infrastructure on mobility is quite apparent as the public transport in both cities is apparently lacking in quality and quantity. It is now well documented that public transport in Indian and African urban environments have low supplies and captive demand markets. Moreover, the services that the public transport offer in these cities are more in tandem and harmony with the regular activities of the city and thus exclude the inactive groups of population. Preliminary studies of activity cycles in Indian cities have already reflected that there is too much mismatch between activity cycles of housewives and provisions of affordable public transport services thus making travel more difficult. Similarly there are other urban services and infrastructures that can

facilitate the household functions to bring activity patterns and public transport closer to improve the capabilities of the inactive population towards the gainful search of the urban economic fields.

CONCLUSIONS

At the commencement of this paper the authors had set for themselves two major objectives, one to understand and evaluate the variations and similarities of urban mobility that can lead towards more efficient policy interventions and secondly to put the settings of a methodology that can make international comparisons more meaningful.

Concerning the first objective, the analysis showed that in both case cities mobility levels and their qualitative characteristics depend not only on transport related factors (e.g. offer of public transport, access to a personal vehicle...) but also on the social, cultural, and economic organisation of the society. Certainly some global policy interventions such as improvement of public transport services in cities of Asia and Africa will have their own positive impacts as the cities and their transport systems are unable to meet increasing demands from the growing population. However, it is still difficult to say whether they will be able to make a dent into problems of low mobility levels of the urban poor set on account of economic and sociocultural factors. The results of this effort are that there is more than the mere provision of public transport, the golden answer to the problems of urban mobility in developing countries, that the cities would need to resolve the issues of inequity and immobility of the inactive urban poor in the cities of Asia and Africa. Perhaps a more coherent and integrated development of urban infrastructure that sets to carry out the daily activity pattern without altering the social and cultural foundations of urban communities will substantially benefit the inactive population in urban areas. Thus, programmes and policies that can alleviate the household tasks or facilitate the growth of economic opportunities and help in the spatial integration of developing societies could be a better proposition in the well-being of this population. Consequently, further international studies on mobility are desirable to see the stability of the findings of the present effort and appear to be an immediate necessity if a tangible progress towards policy formulation in alleviating immobility and deficiencies in mobility is to be achieved.

The comparative studies and analysis of mobility show the need of redefining mobility from gender considerations. Hitherto the level of immobility and inequities were determined from a generalised definition, however if divisions of labour, life cycle development and social considerations are to be borne in mind, it may be desirable to set up unified methodologies and survey procedures to provide answers to some of the pressing questions on mobility, and develop a more suitable rationale for its measurement and use in cities of developing world.

From the methodological point of view, the effort made in this study is important as it has demonstrated the areas of dissimilarities in the data collection and storage methodologies and their role in cross comparisons, which are often lost of sight whilst making international comparisons at an aggregate level. To carry out successfully international comparisons, the authors insist on the need for homogeneous methodology in mobility surveys and their analysis and for a more comprehensive database encompassing the socio-economic and cultural environment of the studied cases.

For a better comprehension of urban mobility in developing countries, further comparisons of other groups of population (active population, young people, aged, women, etc.) must be accomplished. Concerning the transport sector, there are still areas which need to be looked further such as incomes, vehicular ownership and their role in households, and perception of modes before a sound approach can be established for developing suitable and effective policy interventions. It appears that a beginning has been made in this direction and it will be desirable that these efforts are continued further to develop global comparisons without losing the sensitivities of data sets.

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