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Collecting transport and travel data in the Pacific Islands – Fiji's first national household travel survey

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Abstract

Fiji's first national Household Travel Survey (HTS) was conducted in 2015 with a representative sample across the country. It achieved a response rate of 89%.

Commissioned by the Transport Planning Unit within the Fiji Ministry of Infrastructure and Transport, the HTS was the first dedicated transport and travel data collection exercise to be undertaken in the country. To the best of our knowledge, it is the first household travel survey to be conducted by any island nation of the tropical Pacific.

In designing a methodology for the survey, the key question was whether to work with and apply an accepted standard methodology, or to develop and produce a bespoke methodology specifically for Fiji.

This paper describes the methodology used in the Fiji HTS; how a face-to-face survey method with memory joggers was adapted and proved well suited to the Fiji context.

It outlines the main considerations in developing the survey methodology including: the differences in activity patterns of those living in rural areas; the task of developing a workable sampling structure; how to recruit households in the absence of an address resource; and how to geocode stop locations.

It comments on the most significant data collection challenges including low levels of reported travel and respondents with multiple homes. It also shows the importance of defining an out-of-home activity as a destination in community situations – something which could be equally applicable to travel in situations such as within retirement villages in Australia.

It concludes with presentation of the headline results and commentary on the value of this knowledge to transport planning in Fiji. It is expected that the survey will be repeated for the next two years.

1. Introduction

The first Fiji national Household Travel Survey (HTS) was carried out between October and December 2015. It was the first dedicated transport and travel data collection exercise in the country; the first survey of its kind to be carried out by an island nation of the tropical Pacific.

The HTS formed one part of a package of work commissioned by the Ministry of Infrastructure and Transport which included an audit of existing travel and transport data in Fiji, a maritime freight study, and the development of a transport database.

Household travel surveys (HTSs) are designed to collect a comprehensive set of personal travel data – information about the travel people actually make. In recent years it is common for HTSs to run continuously, with three or more years of sample data pooled to produce reliable estimates of travel at a particular geographical level.

The value of collecting data from everyone in a selected household has long been recognised. An individual's travel patterns are frequently determined by factors not related to the individual themselves but related to those of others in the household (e.g. Jones et al. 1983). Only by capturing data on how everyone in a household travels are policy makers able to fully understand the dynamics of travel patterns and able to assess the impacts of changes to the transport system. In this way also it is possible to better understand intra-household travel interactions should the data be used for activity studies.

Whilst household travel surveys are a reasonably common means of data collection worldwide and are conducted on a regular, on-going basis in cities such as Sydney, Melbourne, and Santiago in Chile there are only a handful of *national* household travel surveys. To date these have been mostly in developed countries such as New Zealand (ongoing), United Kingdom (first conducted in 1965), the Netherlands (annually since 1995) and the USA (2016). Few HTSs cover rural areas in developing countries (e.g. Porter et al., 2014)

The aim of this paper is to present an insight into the main factors which shaped the choice of survey methodology for the Fiji HTS, and to highlight some of the challenges with the data collection and potential lessons for future surveys in similar contexts.

The paper begins with a description of the survey methodology. Section 3 presents the key considerations in survey design and outlines how each was addressed. Section 4 comments on the response rate. Section 5 explores the main challenges faced by the data collection exercise. The final section presents headline results from the HTS, and comments on how this information can contribute to transport planning in Fiji.

2. Survey method

In choosing a survey method several factors needed to be considered: time was limited, multiple language versions were needed, familiarity with surveys was low, and internet connections and electrical power could not be relied upon in all areas.

This led to choosing a paper based method that used face to face interviews. A natural choice was to base it on an early version of the Sydney Household Travel Survey (Ampt, 1981). The same method had been used in Singapore in 1991 where multiple languages were needed (Chandrasekar, P. et al 1994). Permission was granted to base the design of the Fiji survey forms on early versions of the Sydney HTS.

The survey was designed to record all the travel made by every person in a participating household on one specific 'travel day'. Travel days were pre-selected and assigned to dwellings prior to fieldwork commencing. Also collected were basic socio-demographic characteristics of the participating households.

The target population was 'people who are the usual residents of private dwellings in the survey area (Fiji)'. This included all people regardless of age or any other factors. Visitors were included only if they were staying at the selected dwelling for the travel day and would be staying at that address continually for 3 months or more – designed to match the Fiji Census definition.

The 'travel day' covered a 24-hour period, from 3am on the travel day to 3am of the next day on a prescribed date. All days of the 7-day week were captured in the survey.

Participation was on a voluntary basis; no incentives were provided for participation.

The survey instrument consisted of two questionnaires supported by other 'tools' designed to ensure ease of understanding by respondents, ease of interviewing by the interviewers and ease of data entry and analysis post survey.

2.1 Questionnaire forms

The **Household Form** collected details about the household and its members including information about vehicles owned. It also recorded additional information to assist interviewers in data checking.

The **Person Form** was to be completed for every member of the household. It collected person details (e.g. location of work and school) and detailed travel (stop-based) information.

Wherever possible the survey questions and answers were phrased to match those used by Fiji Bureau of Statistics.

2.2 Other 'tools'

An **Introductory Letter** was presented to all selected households when the interviewer arrived[1] and was available in three language versions – English, iTaukei (indigenous Fijian) and Fiji Hindi. It was designed to encourage people to participate in the survey.

Each member of the household was given a **Memory Jogger,** in their choice of language (English, iTaukei and Fiji Hindi). Designed as an A5 booklet, the intention was for respondents to jot down basic details of where and when they travelled so an accurate picture of their travel could be reported to the interviewer.

An **Income Show Card** was used to allow respondents to give their income using a letter or number rather than articulating the actual amount – a technique known to increase the response rate for this question (Ampt, 1981).

3. Key considerations

As the first HTS in Fiji, the preliminary planning stage was essential and detailed. It involved workshops with government stakeholders, the client and our team; focus groups with potential respondents; and one-on-one discussions with key subject matter experts in Fiji. This allowed the range of issues likely to impact on the design of the survey methodology to be identified and solutions proposed. A pilot survey was conducted, essentially a dry run of the entire survey process encompassing sample selection, interviewer training, fieldwork, coding and basic analysis. A frank and open review of the pilot led to some minor refinements to the process and survey forms/questions, before the survey was rolled out nationally.

[1] The letter could not be posted, as is common in many travel surveys, as there is no postal delivery service to large parts of the country.

3.1 Activity patterns

Fiji's 2015 population of approximately 845,000[2] is dispersed across 106 islands, with a roughly equal split of people living in urban and rural areas[3]. Viti Levu and Vanua Levu are the two largest islands, home to about 90% of the population. Activity patterns in Fiji are extremely diverse, varying by geography and temporally.

There are effectively two seasons: a rainy season, from November to April, when the weather is generally hot and humid and is the most likely time for cyclones to occur; and the cooler months of the year from May to October. Overlaid onto this is sugar cane cutting season which usually runs from June/July to November. Cane in fields across Fiji is cut (predominantly by hand and by temporary hired labour), transported to the mills by road or by rail for crushing and then exported as raw sugar.

Over one third of the population resides in the Greater Suva area on the island of Viti Levu. Here patterns of life, travel and trip making are not dissimilar to other urban areas in the region and so lend themselves easily to use of a relatively standard HTS methodology.

Results from the focus groups suggested that activity patterns in rural and maritime areas can be markedly different. Most trips are short and intra-village, frequently to communal domestic facilities, and are almost always on foot and along informal pathways. Subsistence trips (e.g. to the fields) are often referred to as 'for work'. Trips outside the village occur infrequently, but are commonly seasonal or regular (i.e. trips into the cane fields during cane cutting season, trips to take produce to market leaving every Friday night); and origins and destinations are often described at a very local level.

This complexity was augmented by the absence of any robust knowledge on existing travel patterns, and the agreed objective of the HTS which was to be able to say something meaningful about travel patterns of people living in Fiji at the end of the first year.

The decision was taken, therefore, to cast the net wide and to define a trip as '*Any movement on a public street - footpath, cane railway line etc – of more than 100m (unless there is a change of purpose or a street is crossed).*'

The survey took place during October, November and December. This decision was made partly in response to external factors, and partly on the basis that Fiji Government had committed to two further iterations of the survey over the following two years. It is the intention that the next HTSs are conducted over different three/four months of the year, so after three years there is a picture of travel over the entire 12 months.

3.2 Sampling

Anticipating differences in travel and activity patterns across the country, it was decided to segment the target population (all of Fiji) into discrete geographical areas – urban, rural and maritime[4].

It was recognised at an early stage that the task of drawing the sample would not be straightforward due to the lack of a suitable sampling frame (a base list which properly identifies every sampling unit – in this case households – in the survey population). Instead the comprehensive list of geographic areas developed for the Fiji Census (Enumeration Areas - EAs) was used and households selected as described below.

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[2] This is the number estimated by this study; there are a variety of published figures that estimate upwards to just over 900,000 people.

[3] 49% rural, 51% urban according to the 2007 Census, Fiji Bureau of Statistics

[4] Based on Fiji Bureau of Statistics classification on Viti Levu and Vanua Levu; all other islands are considered maritime. For the purposes of the 2015 HTS, maritime covered the island group of Kadavu only.

A total of 1,602 EAs are currently defined each containing approximately 110 private dwellings. In order to ensure that households in more densely populated EAs were not under sampled, the EAs were assigned a probability based on a measure of their size (household density) and then selected at random from the probability distribution. Using this method, a total of 116 EAs were selected (60 urban, 51 rural and 5 maritime).

A desktop review of the sampled EAs using aerial satellite images suggested some would be too challenging logistically to permit the surveying of the whole EA in the time available. This included EAs which were geographically large; those with highly dispersed settlement patterns; those where multiple different access routes would need to be used in order to survey the entire area; and those where dwellings were not reasonably accessible by formal transport routes.

These logistically challenging EAs – a total of 47 - were therefore sub-divided and one sub-division was chosen at random. Sub-divisions were assigned manually along geographic boundaries (hills, rivers or roads) using aerial satellite imagery and geo-coded household locations from the 2007 census (when available). The minimum number of households per sub division was 21. Sub-divided EAs were then treated in an identical selection procedure to non-sub divided EAs. All full EAs and sub-divided EAs were subsequently referred to as Survey Zones (SZs).

3.3 Dwelling selection and household recruitment

Fiji does not have a national address database or a GIS of dwellings or private household locations. The task of selecting dwellings and recruiting households was further complicated by a number of factors: the lack of a formal street address for many dwellings (lot numbers are often used instead); the fact that many roads have multiple names or no name at all; the fact that many dwellings are not on the formal transport network; and that postal delivery is predominantly confined to urban areas and to post office boxes.

This meant that households could not be pre-selected or contacted in advance, and an in-field method was required. It also meant that all household locations needed to be manually geocoded.

Resource constraints precluded use of the procedure employed by Fiji Bureau of Statistics where an area is firstly enumerated and then surveyed by the field interviewers. Instead, selection of households took place at the same time as conducting the survey, with the interviewers using a pre-prepared Workload Control Sheet (WCS) and following accepted market research practice as follows:

- Interviewer locates the starting point in the SZ (randomly assigned, shown on paper map).
- Interviewer walks from the start point, keeping left all the time, staying within the boundary of the SZ, recording every private dwelling on a Workload Control Sheet.
- Every fifth private dwelling is sampled. The Workload Control Sheet shows the assigned travel day and date for that household.
- Selected household is contacted and presented with Introductory Letter.

This process is repeated until the WCS is completed and 21 dwellings have been sampled. Households were not replaced if there was a refusal or sample loss (e.g. vacant dwelling).

3.4 Geocoding stop locations

Fiji has a publicly available GIS of road infrastructure[5], however there is no GIS of public transport routes, public transport stops or public buildings. In addition, in rural areas there is often no formal transport or built infrastructure with which to identify and geocode the origin or destination of travel.

Compounding this, public transport infrastructure across much of Fiji is informal. Whilst bus stops exist, buses in rural areas often pick up and set down wherever there is demand. Taxis are widely used and pick up wherever hailed, often carrying multiple separate passengers. And hitching a ride in a private vehicle is common.

The option of using online maps in the field to facilitate geocoding was considered but discounted due to the unreliability of mobile 'phone coverage in some areas and resource limitations. The option of using cached maps was also considered, but rejected.

Instead, a hard copy satellite aerial image overlaid with map grids was prepared for each SZ and provided to interviewers. Interviewers were trained to probe fully for stop location details, asking about cross streets and landmarks. As an alternative, interviewers could use the hard copy map to help respondents identify the location of their travel and record a map grid reference for this on the questionnaire form.

4. Response rates

The final HTS sample size was 2,443 households (105 maritime; 1,071 rural; 1,267 urban) in 116 Survey Zones.

A total of 1,974 households completed the survey in full. A further 80 households partially completed the survey (some people in the household responded). Only 67 households refused to participate in the survey.

A household was classified as 'full response' when all forms (household and person) were completed for everyone in the survey. This means that the overall household response rate for the Fiji 2015 HTS was 89%[6]. It was highest in maritime areas at 99%, 91% in rural areas and 86% in urban areas. This is well above the norm for household travel surveys.

In total 8,574 people participated in the survey. Of these, 8,161 people completed all relevant questions on both forms (and can be considered 'fully responding').

5. Data collection challenges

The HTS methodology worked well in addressing many of the issues highlighted in the preliminary planning phase. The survey was, however, planned and executed from a standing start in 17 weeks (9 weeks planning, 8 weeks survey). As the first survey of this kind in Fiji there are, as would be expected, lessons for future tranches of the survey as well as for conducting HTSs in similar situations elsewhere. This section comments on two key issues: the level of no reported travel and the high number of respondents with multiple homes.

5.1 No reported travel

A total of 374 'fully responding' households are recorded as not making any travel on their travel day, i.e. no-one from these households made any trips at all on their travel day. In all, 4,542 people are recorded as not making any travel at all on their travel day. This includes

[5] Maintained by the Fiji Roads Authority.

[6] Response rate = full response (1974)/nett sample size (2221). Nett sample size = total households sampled (2443) – sample loss (222).

4,223 people from a total of 8,161 people who completed all details on the person form in full (and so can be considered 'full responding').

A review of the data indicates no significant pattern over days of the week, or over the weeks of the survey, and confirms the number of people recording a mobility impairment cannot account for the difference[7]. A series of hypotheses were therefore proposed to guide further investigation.

5.1.1 Hypothesis 1: People in rural and maritime areas don't travel very much

Whilst the actual number of non-travellers is highest in urban areas, the proportion of non-travelling people in each area is remarkably similar (as shown in Table 1) indicating this hypothesis is not supported.

Table 1: Non travellers by area

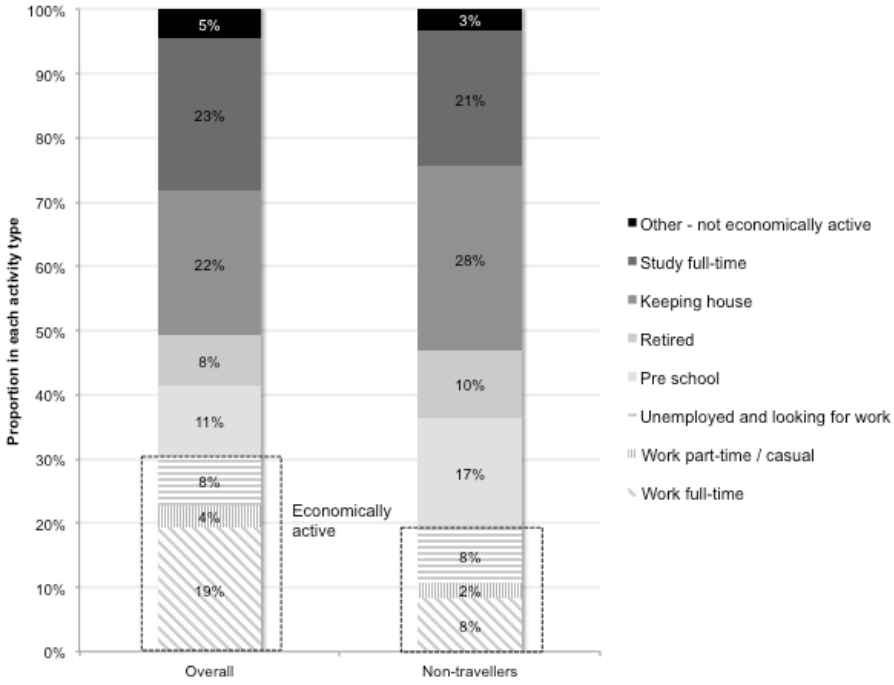
Area	Fully responding - all	Fully responding - no travel	% non-travelling
Urban	4,127	2,192	53%
Rural	3,687	1,862	51%
Maritime	347	169	49%

NB: Fully responding people only

5.1.2 Hypothesis 2: Economically active people are more likely to travel

The data shows that people who are not economically active ('keeping house', 'retired/pensioner', 'pre-school') and those who are not in full time education are over represented in the non-travellers, suggesting some grounds to support this hypothesis.

Figure 1: Activity type breakdown[8]



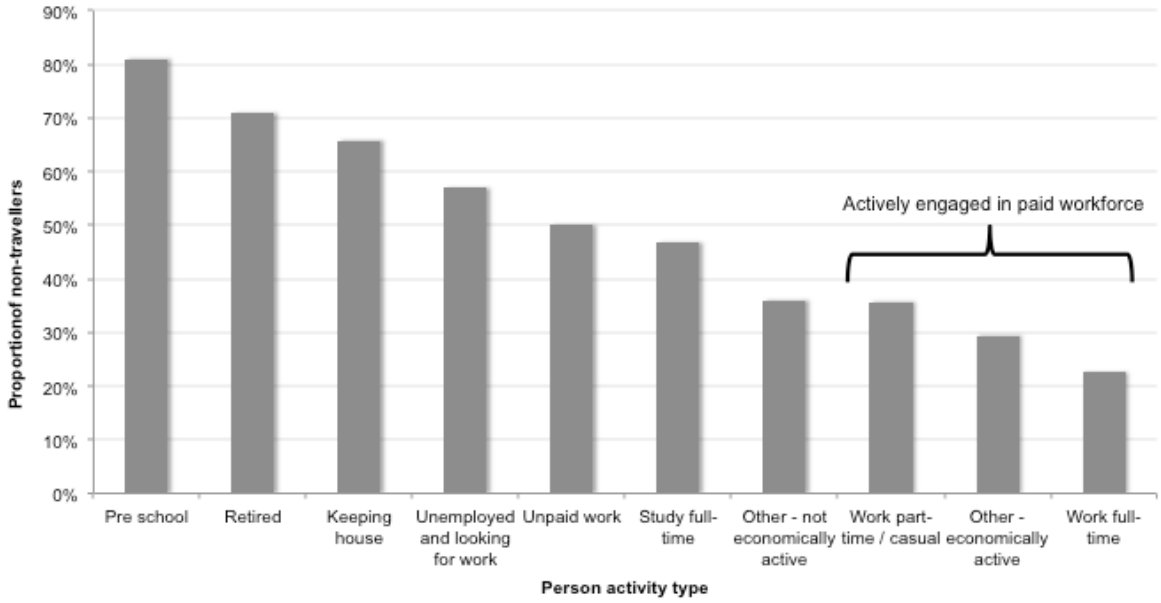
[7] 484 respondents answered 'yes' to having 'difficulty using any form of transport, including walking, because of a physical condition or disability' on their travel day. Of these, 85% (413) people did not make any travel on their travel day.

[8] The categories 'unpaid work' and 'other – economically active' are not shown as they both represent less than 0.5% of the sample, they are however included in Figure 2.

Further analysis (Figure 2) shows that the majority of those classified as 'retired' (71%) did not record any travel on their travel day, and the figure is similarly high for those classified as 'keeping house' (66%).

Conversely, people who work full time are the least likely to record no travel (only 23%), followed by those who work part time or casually (37% recorded no travel), and those who do unpaid work (41% recorded no travel).

Figure 2: Non travellers: proportion by activity type



The quantum of non-travellers in the sample can be partially explained by the proportion of economically active people. Less than one quarter (23%) of all respondents were engaged in the paid workforce at the time of the survey (i.e. working full time, part time or casually), whilst a slightly higher proportion of all respondents (31%) meet the OECD definition of 'economically active[9]' (increases to 55% if only those aged 18 to 54[10] are considered).

Analysis at the household level indicates that 45% of those households which recorded no travel have no economically active people in them. Further to this, non-travelling households are likely to be smaller than the average (2.9 people compared to 4.1 nationally). These findings suggest there is a correlation between economic activity status and propensity to record travel - economically active people are more likely to record travel (see Figure 2).

Two findings warrant future consideration. Firstly, 80% of pre-school respondents (those not yet of school age) recorded no travel on their travel day, possibly suggesting: a) care of young children is shared amongst the household and predominantly allocated to those retired or keeping house; b) child care is assigned to someone coming from outside the household; or c) the travel of pre-school respondents was not reported 'travel' despite the interviewer stressing that it was.

Secondly, 47% of full time students recorded no travel on their travel day. Absenteeism due to ill health and other factors could probably account for 25% of this, and conducting the survey during two weeks of school holidays could also account for some variation, but the proportion is still higher than might be expected and needs to be explored in further surveys.

[9] Defined as 18 years or older, male or female, working full time, part time, unpaid or unemployed and looking for work.
[10] 55 is the legal retirement age for public servants.

5.1.3 Hypothesis 3: Most 'non travelling' respondents did travel on their travel day but did not recall or report the trips made

This phenomenon is often described as non-reporting or under-reporting of trips (e.g. Ashley et al 2009, Richardson et al.,1995).

The methodology used in this survey was specifically designed to counter the issue – using memory joggers (to assist recall) in combination with face to face interviews (to make reporting easy).

This means that the reasons for underreporting could be one or a combination of the following: respondents not wanting to reveal a certain type of trip; respondents not understanding the importance of some trips despite interviewers' careful prompting; respondents overlooking short intra-village trips; or poor interviewing methods. The latter reason is considered unlikely given the extensive interviewer training undertaken, for the pilot and the main survey.

The evidence for this hypothesis is inconclusive and suggests the importance of further research into this in the next rounds of the HTS. If the definition of short trips is the issue it will have relevance to applications in other countries such as Australia and New Zealand in cases where short trips are likely to be important (e.g. retirement villages).

5.2 Multiple homes

It is common in Fiji for people to temporarily relocate to other places in the country for reasons relating to employment or education. Sometimes a family will relocate during term time so children can have easier access to school. More often the children stay with relatives, or at boarding school. Some individuals spend months away from home, working on the outer islands or elsewhere in Fiji.

Although the proportion of households recorded as full non-contact[11] was low (4%), interviewers reported finding dwellings on a regular basis which were considered to be someone's home but were unoccupied for many weeks or months, for one of the above reasons.

These people *are* temporarily away from home. And, unless they are staying in non-private dwellings wherever they are, they do have a chance of being in a household selected for the survey. This means that the temporarily empty homes are actually not a negative for the survey response (as might be indicated by defining them as 'non-contact') *as long as* the definition of 'who is in this household?' allows these people to be included in the household wherever they are. This is currently not the case as they are rarely away for 3 months or more.

Since they are still travelling in Fiji they are part of the target population and it is recommended that future Fiji HTSs consider a definition of who can respond in a household and a final response code to account for these instances. This will be particularly important in the aftermath of Tropical Cyclone Winston when many people across Fiji may be living away from their usual place of residence for extended periods of time.

[11] Full non-contact is defined as cases where '...despite making the required number of calls...you are still unable to contact anyone...' or where 'contact has been made but no information obtained'.

6. Headline results

The 2015 HTS has provided Fiji with a first dataset on how people living in Fiji travel, where they travel to, and when they travel. Further iterations of the survey will be required to get full value from the data, but the lessons and opportunities afforded by this first round of data collection are significant.

This section presents the unweighted[12] data for all respondents who recorded travel, first at the overall level and then for urban, rural and maritime areas. It reports trips made by respondents. A trip is defined as 'a journey from one activity to another, ignoring changes of mode'. In the example below (Table 2), these three 'stops' would be classified as one shopping 'trip'. The 'main mode' is bus.

Table 2: Trip definition

Stop	Origin	Destination	Mode	Purpose
1	Home	Nearest bus stop	Walk	Change mode
2	Bus stop	Suva bus station	Bus	Change mode
3	Suva bus station	Suva market	Walk	Shopping

6.1 Overall results

More than half of all recorded trips (53%) are made entirely on foot, with public transport[13] trips accounting for 17% of trips, private vehicle 17%, and taxi 6%. Travel is facilitated by a diverse range of modes from carriers[14] to buses, mini buses, taxis, horses and boats.

Considering those respondents across the whole of Fiji who recorded travel, people make an average of 3 trips per day, with an average trip length of 5.8km. People who travel spend 71 minutes travelling each day and the most common reasons for travelling are work, shopping and 'entertainment[15]'.

Whilst only 3 bicycle trips were recorded, 3% of households did record owning one or more adult bicycles.

6.2 Urban Fiji

Travel patterns in urban Fiji[16] are not dissimilar to those of other middle income urban areas. The majority of trips are made by motorised modes (63%), with urban respondents the most likely to travel by private car (27% of trips), and overwhelmingly the most likely to own a car (27% households own one or more vehicles). Taxis also play a key role in the transport system, accounting for 12% of all trips, perhaps reflecting the aspirations of many to travel by car and the inadequacy of public transport to cater to this market.

[12] Due to the high response rate the unweighted data has been used.
[13] Public transport is defined as minibus, carrier, school bus service, regular public bus and express bus.
[14] A carrier is a vehicle which is used for transporting goods and passengers. They are usually small trucks with some seating under a tarpaulin covered frame in the back. They are commonly available for hire on demand, and mainly operate in rural areas.
[15] 'Entertainment' trips are for the purpose of cultural, social activity and personal learning activities. It includes attending church, having drinks or food at a public place, drinking kava with friends or family. Since it was a face to face survey, respondents did not see the title of the category.
[16] As defined by Fiji Bureau of Statistics, and includes Greater Suva, Pacific Harbour, Nadi, Lautoka, Ba, Rakiraki, Savusavu and Labasa.

Urban trip makers make fewer trips than those in rural areas (2.8 trips per day), but they travel the furthest with nearly 70% of trips over 1km in length and the average trip length 6.3km. They also travel the fastest, with the average trip speed (for all modes) nearly 19km per hour (compared to 14km/hr in rural areas and 5.2km/hr in maritime areas).

Work related travel is the most common trip purpose (30%) followed by shopping (18%), and the daily profile of travel resembles that of other similar cities, with an am peak around 7-8am and pm peak between 3-6pm.

The dominance of work trips is reflected in the fact that Sunday has the lowest level of trip making (2.5 trips per person compared to 3.1 trips per person on a Friday), and an increase in 'entertainment' trips (38%), which make up less than 10% of trips on weekdays.

6.3 Rural Fiji

People living in rural Fiji make the most trips (on average 3.1 trips per day) and spend the longest time travelling (approximately 80 minutes a day). Travel is predominantly local (42% of trips are less than 500m) and made on foot (nearly 70% of all trips). Contrastingly, long distance travel is actually more common than in urban and maritime areas (15% of trips are more than 20kms) suggesting a dependence on services or income earning opportunities some distance away.

The reasons for travel are reflective of life in rural Fiji. Out of the total of 3,210 trips recorded (excluding trips 'to home'), the most commonly cited trip purpose (821 trips, 26%) was 'other', meaning the trip purpose could not be neatly classified into one of the 18 trip purposes[17] and extra categories need to be added for future surveys. Nearly 500 (16%) of stops are related to subsistence farming and care of farm animals; 53 stops were to collect water or firewood and 55 stops were recorded for clothes washing and bathing purposes.

Trips for 'entertainment' and 'to work' are the next most common, both accounting for 15% of the total (excluding trips to home). On Sunday, 'entertainment' trips, which includes attending church[18], is the most common trip purpose (52%).

Some travel is undertaken by less conventional means: 2% (118) of trips were made by horse (217 households owned horses for getting around), 2% (122) of trips were by boat, with a handful of trips by bilibili (bamboo canoe) and swimming.

6.4 Maritime Fiji

Respondents[19] in Kadavu rarely use any form of motorised transport – 92% of trips are made on foot, and on average 52 minutes out of the 59 minutes spent travelling each day is spent walking. Given the very sparse road network on Kadavu, this is not surprising. And, as would be expected for a small island, boat transport is more important here than anywhere else. But it is not common – accounting for only 5% of trips - most likely reflecting the relatively high cost of such trips. Most other motorised trips are made by carrier (3%).

The total number of trips per person per day (3.1) is similar to those in rural areas, but travel is even more local. 96% of trips are less than 5kms, nearly half (46%) are less than 500m and 30% are less than 200m.

The total distance travelled per person per day is 5.1km, with the average trip length being 1.7kms. Trips off the island are infrequent, with only 3% of trips recorded over 10kms.

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[17] 18 trip purposes: change of travel mode, home, work, work related business, education, shopping, fishing, social welfare, medical/dental, social visits, recreation, entertainment, sport participate, sport spectate, holiday, personal business/services, to accompany someone, to drop off/pick up someone.
[18] Church visits are commonly coded as 'entertainment' in household travel surveys
[19] A total of 354 people responded in full, of which 178 people recorded some travel.

The average data masks a variation in travel patterns over the course of a week. Weekends are the busiest times with an average of 3.5 trips per person compared to 2.9 on weekdays. 57% of Sunday trips are for 'entertainment', most likely indicative of trips to church and for communal eating.

Household income is the lowest of the three areas at $5,500 per year, compared to $18,000 per year in urban areas and $9,500 per year in rural areas.

6.5 Transport planning implications

The data points to challenges and opportunities in terms of managing demand for travel in Fiji as wealth and economic prosperity increases.

The opportunity is the current situation. People living in Fiji are accustomed to getting around by walking and using public transport. In that sense, they have a very active pattern of travel, something many countries are now aspiring to. Even if walk trips of less than 500m are excluded from the mode share calculation (on the basis that these trips would not readily be made by another means of transport), 40% of trips are made on foot alone, 23% by car, 20% by bus and 11% by taxi. People[20] walk for an average of 32 minutes per day and more than 80% of children travel to school by public transport or walking.

The challenge lies in the predictable correlation between travel patterns and economic wealth suggested by the HTS data: as people get richer the use of motorised transport, particularly private cars, increases.

In urban areas 25% of trips are by private vehicles, compared to 9% in rural areas and 0% in maritime areas. Across Fiji only 16% of respondent households own one or more cars (compared to Australia and the US where only 8-9% of households do *not* own a private vehicle).

However, the level of car ownership is higher in urban areas (24%) compared to rural areas (12%) and there is a clear relationship between household income and car ownership - it only takes modest increases in household income for car ownership to increase. The majority of households in the sample (57%) are on incomes of less than $10,000FJD per year and car ownership for this group is at 8%. Car ownership rises to 20% amongst households with incomes of $10,000-30,000FJD, and jumps to 46% amongst households with an income in excess of $30,000FJD (although only 10% of households in the sample fall into this income bracket).

It would appear that Fiji is at a tipping point in terms of transport and travel, transitioning to a more car based transport system as wealth and prosperity increases and urbanisation continues. The evidence suggests consideration should be given to find a way to sustain the current high levels of active travel whilst continuing to support economic development.

7. Conclusion

The Fiji national Household Travel Survey has delivered the first ever resource of national transport data to the Fiji Ministry of Infrastructure and Transport. This is already being used by Government and stakeholders to make informed transport planning decisions. Further iterations of the survey are planned and will enhance the value of the data significantly.

As would be expected with the first survey of its kind in the Pacific islands the data raises lots of questions, some of which need further testing. This must include thorough investigation into whether the apparent high number of non-travellers is accurate and, if not, whether and how these 'missing' trips can be better captured. It would be incorrect to make

[20] Considering only those who recorded travel.

judgements about excluding these people without further research given the criticality of measuring changes over time for planning and policy making.

In planning a large scale data collection exercise value for money must be a key consideration, especially in a country where there are many competing needs for resources. Where the priority is for the planning of transport infrastructure and services across rural and urban areas, careful consideration must be given to the types of trips that are targeted. For example, very short trips which are part of domestic routines are not likely to be useful for the purposes of infrastructure or service planning, although they might be of interest to those engaged in community level research.

However, the most important overall conclusion must be that it is possible to apply a relatively standard household travel survey methodology in the context of a middle income island nation such as Fiji. A comprehensive resource of demographic data has been compiled and we have a good level of confidence in the transport data collected. Fiji now has a sound basis from which to develop and refine future tranches of the survey, and consolidate a robust resource of transport planning data.

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