Improving Bus Service in Hyderabad, India

Priya Jindal[1]
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Abstract

Anyone who has taken buses in India can attest to the difficulty in finding the right bus going to the destination desired in a timely manner. It usually involves running after a bus and asking the driver if that bus goes to your destination. This is hardly a full-proof method, as the driver may mishear you, or you may mishear him resulting in boarding the wrong bus or missing the right bus. Nearly every time I venture to a new destination I inevitably end up taking three buses to a place that has a direct bus.

The large majority of cities in India are reliant upon public bus service as the main mode of mass public transit. In most cities, buses are incredibly overcrowded with people hanging out of doors and packed in the center aisle like cattle being taken to slaughter. Many people climb off the bus looking as if they have just emerged from a fight; in fact, they may have. The current bus regime is far from perfect, but steps are being taken to reform the system.

Notably there have been moves to create more efficient bus services in Pune and Ahmedabad, with the institution of a Bus Rapid Transit System. In Indore, global positioning devices have been used to provide passengers with current information on arrival of buses. These steps in various cities provide examples of what other cities looking to reform their own bus regimes can do.

In Hyderabad, the buses are the main public transit system, followed by the multi-modal transit system: a heavy rail that shares the main Indian Railways tracks. Andhra Pradesh State Road Transport Corporation (APSRTC) runs over 18,000 buses throughout Andhra Pradesh. The enormity of their fleet, coupled with the thousands of routes run daily makes change difficult, but all the more necessary. APSRTC services about 126.3 lakh people daily[2] and so must provide the best bus service possible.

To facilitate better bus information I worked with APSRTC in Hyderabad to determine the feasibility and demand for more accessible bus information. I specifically worked with two bus stops in the city to try and prove that new bus signs with specific line diagrams for routes passing through the station and timing information are necessary. This paper looks into the method for surveying these bus stops and conclusions found from such a survey as well as what can be done to reform the regime based on the findings.

1.0 Background

I am a 2006 Indicorps Fellow living and working in Hyderabad, Andhra Pradesh. I work with an organization called the Foundation for Democratic Reforms. My work has centered largely on research regarding urban transportation in India. For this specific project, and to add value to the organization that I am working with, I created a large document detailing challenges to urban transport and solutions in order to stimulate awareness to the transport system, in the hopes of changing it nation-wide. The document tackles many different suggestions, which I decided I should look into implementing on a small scale here in Hyderabad. In this report, I suggest that ultimately, Hyderabad should overhaul the entire bus system and create a Bus Rapid Transit System (BRTS) modeled on the Bogotá, Colombia.

The ideal BRTS in Hyderabad would allow for center lanes to be dedicated exclusively to buses with low platforms that are at the same level as new bus stations. Looking at the Bogotá, Colombia model provides a good example of what should be done in Hyderabad, with some changes due to the nature of the different cities. The Bogotá system has a free feeder system of yellow buses that bring people from neighborhoods into the main system. The main corridors have stations that individuals pay a flat fee to get into each time and then can ride the system wherever they want. The flat fare allows for

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[2] Profile. < http://apsrtc.gov.in/About%20Us/Profile/Profile.htm >. Accessed 16 May 2007.

those who travel longer distances to be subsidized by those who travel shorter distances. This system works in Bogotá because those who tend to be of lower economic classes live further from the main hubs of the city and travel further for work, whereas higher economic classes travel shorter distances.[3] In Hyderabad the situation is largely similar and so a flat fare could allow greater access to more people further out in the city. There are a few other technical elements I'd like to see in the system, including articulated buses (also known as vestibule buses) for greater carrying capacity and large automatic doors for faster boarding and alighting.[4] I think the greatest step would be to have digital signs, similar to what you can find at European train stations or on the London underground. The signs would tell which buses come through the stop and when they would arrive or even which bus is approaching currently. This means expanding the pilot GPS system into many other buses and allowing for the information to reach passengers in real time. I think that the signs at current bus stops are a step in the same direction.

As a first step towards bus stop signage I looked at the bus authority in Hyderabad. The Andhra Pradesh State Road Transport Corporation (APSRTC) runs the buses throughout the state of Andhra and was the authority I would need to approach for change.

The APSRTC was established in 1932 under the Nizam, as the bus provider for the then Hyderabad State. After the Road Transport Corporation Act of 1950, the APSRTC came into being January 1958. Starting with just 27 buses they have since grown to be the single largest bus fleet in the world, having 18,132 buses.[5] The Hyderabad Region, one of 23 regions under APSRTC, runs over 400 routes through 900+ stops.[6]

APSRTC has been diligently working on changes to the system to allow for line diagrams within buses and signs with bus numbers at some stops. APSRTC has also worked on ensuring that each bus stop has a list of each bus number that passes through that stop. The biggest achievement for APSRTC has been the institution of booking centers at about 40 bus stops. At these bus stops a passenger can get information regarding long-distance buses and book them right there. These kiosks are great services, but are incredibly limited. They cannot give accurate information about local bus routes or timings. APSRTC has set up a call center where one can call in to get information regarding local buses;[7] however, there is no guarantee the information they give is accurate. On the one occasion I have called, I was given an inaccurate bus number for my destination. In lieu of this, it is possible to buy bus maps for 10 rupees that provide the numbers of each bus and the major stops on the route. These can be incredibly useful if you know the city well and how to get to your destination. Unfortunately, due to traffic and high passenger load it is unlikely that buses will be on time as listed on the map.

Most recently, APSRTC has installed GPS in one route's buses so that passengers know which stop is coming next and can make their way to the front of the bus.[8] APSRTC has made strides in creating better customer service, but they have a long way to go as there are still many people who do not know how to get to their destination and even more who know how to get where they need to but cannot do so easily.

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[3] Lee, Myung-Kyoon. *TransMilenio Bus Rapid Transit System of Bogotá, Colombia*. Asia-Pacific Environmental Innovation Strategies (APEIS); Research on Innovative and Strategic Policy Options (RISPO); Good Practices Inventory. April 2003. pg. 3.

[4] Lee-Myung-Kyoon. Pg. 4
[5] Profile. < http://apsrtc.gov.in/About%20Us/Profile/Profile.htm >. Accessed 16 May 2007.
[6] Meeting with Mr. Pandu Rangamurthy, Regional Manager APSRTC for Hyderabad on 11 April 2007.
[7] Meeting with Mr. Pandu Rangamurthy, Regional Manager APSRTC for Hyderabad on 11 April 2007.
[8] Naidu Launches Bus Tracking System. < http://www.thehindu.com/2004/02/06/stories/2004020602250500.htm >. Accessed 19 May 2007.

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Upon initiating discussions with APSRTC regarding the current accessibility to information they gave me a great deal of information regarding their current projects to create greater access. They showed me the recent line diagram that has been made for one bus route (225D) and explained constraints they faced in creating more signs—resources and the defacement of signs. Hyderabad is also in the process of widening many of their roads, resulting in bus stops being uprooted and the bus shelters disappearing for weeks on end.[9]

APSRTC took me to the Sanath Nagar Bus Station, an enormous station with signage regarding routes passing through the station. The sign looks like the depiction below:
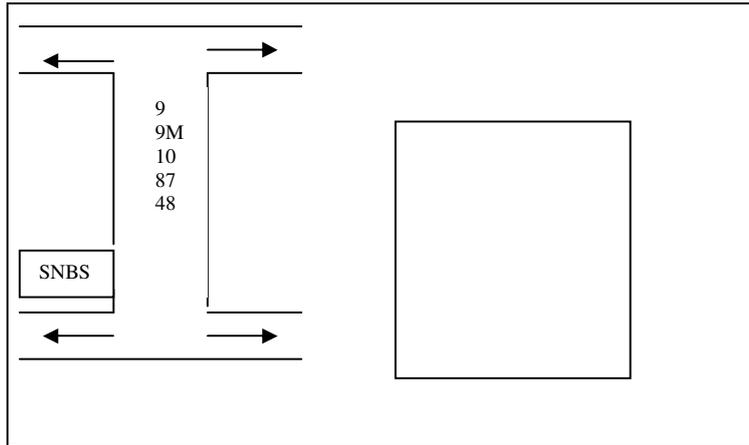
The arrows tell which buses go where and the end destination. The small box in the right hand corner lists the buses numbers with the starting and ending destinations and frequencies of bus arrivals and departures. The small box protruding on the left side of the main thoroughfare is where the Sanath Nagar Bus Station is. The sign gives a fair amount of information if you know the city well, but due to the fact that routes may still differ, it is not all that comprehensive. Regardless, it is a huge first step in getting signage out to stations.

The Sanath Nagar Bus Station is a large station, nearly a quarter of a kilometer long, with adequate space in the back to park buses and for buses to turn around easily. The center of the bus station is made up of three sections that constitute the actual bus station. The section furthest from the main road is the largest and houses the ticket counter, for daily and monthly passes. It also has offices for conductors to sit in when they are on break and for other bus officials to use. Conductors' records are collected and recorded here for some routes. After the closed section, housing offices and the ticket counter, there is an open section with a television screen and pillars on whose bases individuals can sit. This is the main waiting area for most passengers. The television screen is tuned continuously to Telugu songs and most people face the screen as they wait for their bus. About two or three people sit on each pillar base, with their bags near their feet. In the center of this open area there are two large metal signs, one with bus numbers, a directional map, and beginning and end destinations of each route and a second one that lists each bus number and the times that that bus should arrive at the Sanath Nagar Bus Station. On average about 30 people wait in this section at any give time. Some will also wait further back, sitting on the curb in front of offices

There is another small building called the APSRTC Goodwill Centre. In this building one girl sits for about 6 hours during the day with another replacing her for the 6 hour night-shift. This is supposed to

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[9] Meeting with Mr. Pandu Rangamurthy, Regional Manager APSRTC for Hyderabad on 11 April 2007.

be an information center. From here one can generally ask about buses (when the next one will arrive, which one to take to get to a certain place, etc) and can also buy daily and weekly passes. In addition, this building holds information regarding special buses (those that run to tourist attractions on Sundays) and the large 10 rupee bus map of all routes in Hyderabad.

There is a small covered shelter where another 20 or so people wait for their buses. This small shelter is a covered slab of cement about 4 meters long. Here there are rails as if organizing a line, on which people lean as they wait. This is the essence of the actual bus station. On either side of the station the road is lined with many small shops, mostly selling juices and snacks to waiting passengers. On average there are about 50-60 passengers close to peak hours, with around 30-40 during off peak hours. It is a large, fairly busy station with many people around. Seeing the Sanath Nagar Bus Station allowed me to see what signage might look like once implemented and I thought it necessary to examine this in contrast to bus stops without signage. I looked at one other bus stop with no signage.

The Erramanzil stop is a much smaller bus stop, though not as small as the pole stops that are considered further outside the city. These pole stops are marked only by a metal post which says APSRTC and lists the routes that come through. This particular bus stop, Erramanzil, has about 5 shelters, which is essentially corrugated metal sheeting on four metal posts with a signboard on top to allow for advertisements. Underneath the shelter is the sidewalk which has been built up near the back and can be used as benches, although one side has metal benches installed underneath the shelters. In total it is probably about 10 meters long. The shelters are built on the sidewalk, about 45 centimeters from the ground. In front of the shelter is the road, which is cordoned off by large metal signs about 4 meters out. These signs create a bay for the buses to stop in so that passengers don't have to try to cross traffic to get to the bus. There is a paan stand in the center of one side and the other side has a computer kiosk that sells long-distance tickets. On average there are about 30-40 people waiting during peak hours and only maybe 5-10 during off peak hours. There are no signs or waiting bus officials at this station and so information is usually obtained through asking other passengers.

2.0 Method

Upon seeing the Sanath Nagar Bus Station sign I decided it would be worthwhile to examine how effective the sign was. The Sanath Nagar Bus Station had two large signs with information regarding buses passing through the stop and their final destinations, whereas the Erramanzil stop had essentially no information-only a pole listing the numbers of buses passing through the stop. I wanted to measure the usage of the large sign at Sanath Nagar and its effect on passengers. To do this I created a two fold study. I made a chart which would catalog the number of people at the bus stop and the number boarding buses during different time slots (5 minute intervals for the Sanath Nagar bus station and 2 minute intervals for the Erramanzil stop).

Time	Total	9	9M	10	37sn	48	83	45K	45S	92S	158	185S	113S	189
8:55AM														
9:00AM														
9:05AM														
9:10AM														
9:15AM														

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Within this chart I also kept track of how many people would ask drivers or other passengers which bus to take. The second part was to ask individuals at the stops a few questions. I wanted to see if they took the bus regularly and so knew their route and what they would do if they needed to go to a different destination. Lastly, I'd ask what they would like to see changed at bus stops.

My first test was at the Erramanzil bus stop where I counted total passengers and the number of people asking about which bus to take. This allowed me to figure out on average how many people ask out of the total number of passengers. It provides a quantitative observation of the usage of signs. The station is small and so while there were some challenges it was not too difficult to get fairly accurate counts of the number of people waiting and asking for directions.

The next morning I went to survey the Sanath Nagar Bus Station. The station is enormous and so it is next to impossible to keep tabs on how many people are around and even how many buses are actually leaving. It was here I realized that I would simply try to observe if people did indeed ask drivers or other passengers and depend largely on my short interviews with waiting passengers. I spoke with a number of passengers to gather information and found more constraints in this interaction, but still made a fair bit of progress.

I was able to estimate the number of people at the station at any given moment, based on a rough count of the number of people I could see. After a few minutes of this I was able to get a good idea of how many people were usually boarding or alighting from a bus and so my estimates should be fairly accurate. In addition, I tried to spend as much time as possible talking to people. This usually took more time than the observations, because people had to be approached and the interviews were more like short dialogues. Still, this part of the assessment provided the most information, in light of the compromises made in observation.

3.0 Findings

I found that at both stations people would ask drivers or other waiting commuters which bus to take. It was more prevalent at the smaller bus stop than at the larger station. On average the smaller stop would have between 20-40 people depending largely on how long it had been since a bus had come. Of this I was able to speak to only one or two people every 10 minutes, an average of about 5-6 people in a half hour. This is an incredibly small sample size as I would have to sit down and take time to engage interviewees.

At the small station it was more likely that someone would ask the driver or other waiting people. In a half hour at this bus stop I saw at least 11 people ask others where to go. In contrast at the large station, I saw an average of 5 people ask in a half hour, but at a station where the average waiting population was about 50 people. The larger stations results may be skewed as all the buses could not be seen so it was not possible to record the number of people actually asking about buses, but it seemed to me more people knew the bus schedules there. Given the distance of the Sanath Nagar Bus Station from the main passages it is likely that passengers boarding or alighting here are regulars, and so have a better idea of which buses to take. At the smaller station there are many businesses nearby so people may have come to a place they do not usually frequent and so needed directions more often.

Of the people I spoke with the overwhelming majority were regular passengers. They would take the bus about 12 times a week, to and from home and their destination, usually work or college. These people knew the major bus routes and rarely had to go anywhere different so had little need for knowing other routes. Of the total number of people interviewed, about 20, only 3-4 did not travel by bus regularly. These people were often harder to speak with because they did not know which bus to

take and so would often be busy trying to catch the bus. These people asked other passengers, the drivers, or me about which bus to take.

In general, most people have become largely accustomed to asking for directions. The sign adds little value because people do not bother to use it. I think that the sign could be greatly improved, including line diagrams with accurate routes, approximate time to cover distance, and the frequency of the buses noted. I believe that improving the signs may make them more valuable. Of all the people I interviewed only one individual said that signs would be helpful at bus stops. Everybody else either did not know what could be improved or mentioned seating at stops. If I were to bring up signs and ask if a certain type of sign (the one I have described above would be valuable) most agreed that it would be a good addition. This convinces me that there is a need for bus signs. I believe that though people have become accustomed to the current regime and demand other amenities, there is in fact a need for signs, just not the public demand for the need.

This study provides some insight into what the customers of APSRTC are thinking and demanding. Such studies are few and far between in India. Even origin-destination studies, a staple of most transport regimes are not often used to assess public transit projects in India. While many people have an idea of what is needed or what parts of cities are most highly trafficked, such studies are necessary to provide optimal service. As India develops more customer-service industries and customer satisfaction becomes more important such studies will have to be done in order to create more effective services that are in demand by customers.

Surveys are effective methods of measuring satisfaction, change, and demand in a customer population. Great changes are afoot in transportation in most large Indian cities, but to make sure that these changes are effective surveys must be instituted to ensure that money is being spent for the citizens in the manner they wish to see it spent. This can be further extrapolated to nearly any service sector. Customer satisfaction and demand must be met. This is most easily measured through asking people about their opinions and satisfaction. India's move towards service industries where customer service becomes the only way to ensure business will require more studies to be pursued in order to create the best services possible for customers.

This is a small study looking into a very specific measure of change, but the principle and ideas can be expanded to larger studies that look into regime overhaul, other specific avenues of change, and in general to survey public opinion on the current status of the public transport regime. Such studies can often provide insight into where citizens would like to see change and in what form, allowing for advocates of change to have a stronger basis from which to lobby and providing lawmakers with reason to change the system.

4.0 Constraints and Limitations

The study was obviously limited by a large number of factors. These are listed below for easy access and then discussed to look at ways to alleviate these challenges to the accuracy of the study.

- Language barrier
- Scope of study (only 2 bus stops for just one week)
- Number of surveyors
- Gender issues
- Not testing the sign I'd like to see
- Uncooperative people

The challenges were several, but they can easily be overcome through a few simple changes and even through different surveying methods. My method of self-surveying allowed for me to absorb a few other things along with what I recorded, observations I would not have received from others doing the study for me. I do believe that training a few volunteers that were interested in improving public transport would have been a good idea. It would have allowed for a more diverse group of people that would have the language skills to speak with more individuals (whereas I was limited to only those who could speak Hindi or English). In addition, diversity would allow for male volunteers who would have found it easier to talk to other males, whereas I had difficulty talking to males. I could also have covered more stops in the same time. I think that this could have been easily done with better planning and preparation.

There are some barriers that could not have been overcome by me alone. I found that usually the male gender was either not interested in speaking to me, or that they would question what I was doing to a degree that did not allow me to pursue my questions. Second, people usually thought that I needed help finding a bus. When people saw that I did not need help, they usually did not want to continue answering questions and would make some excuse to leave. I think that these barriers can be overcome by trying to engage people in conversation first, although this takes a great deal more time, or by having multiple volunteers with an official purpose. I did ensure that I asked no personal information such as name, professions, their bus destinations, or any other such questions. However, some friendly interviewees did converse with me and told me a number of details, but I never pressed for information in order to make the interviewees feel at ease. I did record answers on paper; I believe this intimidated my interviewees, as they would have preferred a conversation without this other intrusion. I believe that this can be alleviated by audio-recording answers, instead of writing them down.

One way to encourage people to talk would have been to create incentive-based surveying. This is done in many psychological studies regarding economics. Providing the interviewees an incentive, such as food, may have allowed for a larger sample size. Incentive-based surveying, however, must also be examined to ensure that the sample chosen is not predisposed to certain actions or a way of thinking as is evidenced by their willingness due to the incentive.

I believe that the study could have been more accurate and covered a wider area by using a wholly different method. Another effective way to measure the number of people asking about bus destinations would have been to ask conductors (who usually provide this information) to record the number of times they were asked about bus destinations at each bus stop. This could be contrasted with the total number of passengers that rode the bus as recorded by ticket sales. Such a method would allow for greater scope and for greater accuracy as each individual conductor would record the times he was asked about bus destinations. Unfortunately, this method would not take into account waiting commuters who ask other passengers. In addition, it may have been difficult to convince conductors, who already have a job to do, to collect this data in addition. It is an idea that should be explored, especially as a supplement to the study.

While the study was limited in scope and was definitely skewed by my language barriers and gender barriers it still provided some insight into what people are wanting from the bus stations.

5.0 Next Steps

As I mentioned the questions that I asked in my survey did not lead me to believe that there was a demand for new bus signs. When I analyzed the transportation situation thoroughly though, I realized that the need was apparent by the number of people asking for directions. Also, when I brought up

bus signs people were receptive to the idea, encouraging me that effective signage would add value and be well received in the community.

The need for signs has been established creating effective signage in a form that is accessible and lasting has been proven. Now it must be implemented under APSRTC's constraints. To do this more information from APSRTC must be gathered. I have spoken to APSRTC about having each and every stop recorded as well as detailed route plans for each route. Route information with each stop and the routes is already in existence. This information must be collected for the seven large stations with which we plan to start. The information must then by synthesized so that appropriate diagrams can be made. While we have route information, we need to gather the average time it takes to get between stops as well as what other routes can be accessed from the stops along the way. This information must then be presented in an accessible manner for commuters.

All the information needs to be gathered from the APSRTC and compiled into line diagrams of each route with all the essential information. An example of one effective line diagram would be similar to the one below.

| :00 | :10 | :25 | :40 | :55 | 1:00 | 1:05 | 1:15 | 1:25 |
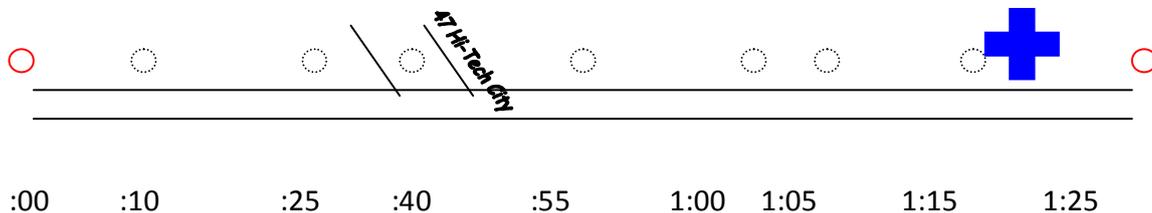
The above schematic would also list the names of each stop (the circles) and the buses that could be caught at those other stops along with the direction of the off-shooting roads, as the 47 Hi-Tech City shoot-off shows. Such a map with each stop and the time taken to get there would provide a great deal of information for passengers.

One of the most important design recommendations is to include landmark symbols so that individuals have an idea of where they are headed. This is important because some people may be illiterate and because schematic drawings make it difficult to ascertain precisely where you are without such clues. A blue cross, as above, could be used to designate hospitals, which are common landmarks in the city.

In addition the signs should be provided in at least three languages: English, Telugu, and Urdu. If possible, Hindi should also be added for visitors and any of the inhabitants who are more proficient in Hindi than the other languages. Given that we want to do this for the 7 largest bus stations, nearly every bus route will have to be mapped out.

While compiling the information into line diagrams it would be wise to start trying to address the two main concerns in putting up signs: the cost and how to ensure that the signs remain readable and do not end up getting defaced. To do this I think that corporate sponsorships may be the best way to go. A corporate sponsorship would give enough initial money to create durable, weather proof signs. I do not know how to combat the defacing problem, though putting the sign in a case and hanging that may be effective, but may also make the sign less accessible to viewers. How to put up signs to prevent against vandalization, including posters pasted over any flat space, spitting of paan onto every surface, and other such acts of destruction, must be further explored to decide what would be most effective.

After creating the signs a follow up study should be done with a pilot sign. One sign should be put in a station and its effects should be measured once people have had a chance to get used to it. I expect that signs will bring the number of people asking directions down to nearly zero. The signs should be studied to see if they can be improved and should be regularly updated. If the signs are effective they should be expanded to all other large stations. Thereafter, a feasibility study to see if the program can

be expanded to each stop, including the pole stops should be done. If such an expansion is possible more corporate sponsorships should be found for expansion of the project.

Such a project would allow for Hyderabad to have world class signage, making it easier for all commuters to traverse the city. This could then be used as a model of effective signage throughout the rest of the country. Studies should be done regularly to judge the efficacy of the program and find out what other changes commuters would like to see. Ultimately, with enough resources, an automated board that can provide real time information regarding when buses will arrive will be the ideal. Until then, these signs will provide more information than is currently available to the average bus rider.

6.0 Conclusion

Surveys in India are currently few and far between. They can, however, be used to assess needs and demands in a specific industry. Here the study showed that the need for better information communication was necessary. I believe demand will surface once people realize that there is an alternative solution to the current regime. This study should be done to assess the efficacy of new signs once they are put in and to assess the need and demand once again for similar signs. Such studies, if done correctly, offer a great deal of information to various organizations, including government agencies and any other service providers. Such information can be used to further product development, develop effective marketing strategies, and respond to customer demands. Using surveys and studies as tools for expanding or making your business or service delivery more effective seems to be fairly obvious. Helping to start the process and prove that it can be done and then use findings to change the system should allow for this process to be continued. The findings of my study prove a need for greater accessible information, now if we can respond to that need and then work on responding to the other demands of passengers, the survey will have been used to its greatest extent. A follow up study will allow APSRTC to assess the efficacy of its implementation and next steps to further better customer service. This study is a small step in that direction.