

Spring 3-2-2019

BART: An Assessment of Declining Ridership

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BART: An Assessment of Declining Ridership

Submitted by

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for

EMPA 396 Graduate Research Project in Public Management

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March 2, 2019

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Abstract

The Bay Area Rapid Transit system has had a decline in ridership of 6.2% over the last three years (BART.gov, 2018) There has been a multitude of reported issues that could be affecting the way people travel locally in the Bay Area. This study investigates the reasons Bay Area Rapid Transit passenger use is lower than previous years. Increased crime rates and lack of safety on Bay Area Rapid Transit are critical reasons for the decrease in ridership. This study is intended to be beneficial for both the Bay Area Rapid Transit system organization and the San Francisco Bay Area as a whole. Recommendations are provided, which point to ways to increase ridership and relieve major congestion on the local interstates. The research methods utilized in this study include primary data collected from surveys on citizen use of BART and from Bay Area Rapid Transit system employees. The results of this study will provide insight as to why there has been a decline in ridership, as well as possible ways in which ridership rates may increase.

Chapter 1- Introduction

Background of the Problem: The Bay Area Rapid Transit system provides commuters an alternative to driving on the extremely congested freeways at a fraction of the cost. With the traffic congestion and commute times topping the charts worldwide, the Bay Area needs a safe and reliable public transportation system. According to a recent study done by INRIX, San Francisco ranks as the fifth highest in commute times in the world (Cookson, 2018). The concept of the Bay Area Rapid Transit system was started in 1946 just after the Second World War had ended ("A History of BART: The Concept is Born | bart.gov", 2019). With the amount of use the Bay Area Rapid Transit system has encountered throughout the years, vital upgrades not only for safety, but for comfort have become imperative. This will ideally keep people riding Bay Area Rapid Transit and deter them from looking for alternative means of transportation in and out of the Bay Area.

A significant and widely publicized issue is criminal activities on Bay Area Rapid Transit. Additional issues like drug use, homelessness and murder seem to be in the news more frequently. There are several news articles that document the issues with homelessness, as well as needles littered on the platforms and trains.

Main Research Question

Statement of the Problem:

Ridership is down 6.2% for the last three years. The budget summary for the fiscal year 2018 breaks it down more. Average weekday trips for FY17 were below budget by 4.9% and 2.3% below FY16. Saturdays and Sundays also missed their budget projections by 11.3% and

13.9% and are lower than FY16 by 6.6% and 7.2% respectively. By the end of FY17, total trips for the fiscal year were 6.2% below the FY17 budget and 3.4% lower than FY16 (*Budget Summary Fiscal year 2018, 2017*).

	FY17 Budget	FY17 Actual	% Change	FY16 Actual	FY17 Actual	% Change
Avg Weekday Trips	445,441	423,395	-4.9%	433,394	423,395	-2.3%
Avg Saturday Trips	212,047	188,190	-11.3%	201,397	188,190	-6.6%
Avg Sunday Trips	155,005	133,482	-13.9%	143,837	133,482	-7.2%
Total Trips (millions)	132.4	124.2	-6.2%	128.5	124.2	-3.4%

Image retrieved from the *Budget Summary Fiscal Year 2018*. This shows that most of the people who are avoiding the Bay Area Rapid Transit system are doing so on weekends when there is usually less traffic and more options to drive. This means when people have more options to travel they are avoiding the transit system.

Loss of passenger revenue directly impacts the overall operating budget for BART. In the 2018 adopted budget, ridership revenue accounted for \$578.8 million dollars (*Budget Summary Fiscal year 2018, 2017*). Financial assistance accounted for \$328.8 million dollars of the budget (*Budget Summary Fiscal year 2018, 2017*). When there is a loss of 6.2% of ridership, that is a direct loss to the total operating budget of \$54.29 million dollars every year. This also directly affects the cost per passenger per mile, which is up 9% from 2017 to 2018 (*Budget Summary Fiscal year 2018, 2017*).

Lower ridership on BART directly increases congestion on the freeways. People are working more now than they have in the past few years with unemployment down. There are a few other ways that people can get to work other than the Bay Area Rapid transit system such

as ferry, personally owned cars, bus, Cal Train or ride shares. When people stop taking Bay Area Rapid Transit system, it puts more of a strain on other avenues of commuting.

Purpose of the Study: The purpose of the study is to describe, examine, assess and evaluate the reasons for low ridership on BART. This study analyzes the reasons for the downward trend in BART ridership and provides recommendations on how to address and solve the problem. This study examines and assesses an increase of people working from home, crime rates on the rise, and the media highlighting issues like these as possible reasons for the BART ridership decline.

Significance of the Study: This study is intended to provide more information on why the majority of the Bay Area has decided to not ride Bay Area Rapid Transit. Understanding why there is a decline in ridership can help the Bay Area Rapid Transit system plan financially for the future. If there is going to be a continuing decline, the transit system will need to find other funding sources. Furthermore, this study could also give an insight to the organization on how to fix their public image and increase ridership.

Research Hypotheses: The following research hypothesis was examined in this study: Reducing crimes and increasing safety on the Bay Area Rapid Transit system will lead to greater user confidence and increased passenger ridership.

Assumptions and Limitations: This research has limitations; the first limitation is time. This study will be conducted in less than eight weeks, therefore, collecting all of the pertinent information is critical. This study will have financial limitations, which may limit the scope of the study. Limitations may also have an inability to reach enough of the population affected by Bay Area Rapid Transit. This study will be limited to crime and safety issues that occur at Bay Area

Rapid Transit trains and stations.

An assumption of this study is that due to the crime that occurs on the Bay Area Rapid Transit system, people are only taking the transit system during the weekdays when congestion on the freeways is at its peak. An additional assumption is that if there was a reduction in crime, people would feel safe to ride the Bay Area Rapid Transit system and would do so for convenience not only during the work week, but also on the weekends. An assumption of this research is that lowering criminal activities will result in higher transit passenger ridership. Studies examined, scholarly literature and personal observations point to these variables as contributing factors that increase ridership, in most cases.

Scope and Limitations: This study is limited to the San Francisco Regional Bay Area and include the following counties: Contra Costa, Alameda, San Francisco, San Mateo and any others that people commute from to use the Bay Area Rapid Transit system.

Definition of Terms:

- Safer Bay Area Rapid Transit stations means that the stations themselves are sanitary and more importantly, this means the removal of needles.
- Safety for the riders includes the decline of crime in both trains and stations.
- Ridership includes the people paying fares to ride Bay Area Rapid Transit and does not include those who jump the fare tolls in order to avoid paying their way.
- Bay Area Rapid Transit is a light rail system that operates and serves the people of the San Francisco Bay Area.
- The commuting workforce applies to people who do not live in the same area which they work. This means they have to travel to get to and from their place of work.

Expected Impact of the Research: The value of this research is imperative for the Bay Area Rapid Transit in understanding why there is a decline in ridership. There are a few possible answers and being able to eliminate one or even pin point a few reasons for the decline may help Bay Area Rapid Transit improve in the areas that they fall short. From a public administration standpoint, knowing why an issue occurs is a large part of the battle. Coming up with a resolution on how to fix the decline of people riding Bay Area Rapid Transit is critical. If the hypothesis is proven correct, then this may give Bay Area Rapid Transit an outline of how to improve their transit system.

Chapter 2- Literature Review

The literature reviewed in this study encompassed several consistently repeated themes and included: (1) criminal statistics, (2) crime and public transportation and (3) crime issues and innovative ideas on public transit. There are many media and press reports focusing on the negative aspects of transit systems failures. Some of the limitations of this research include finding positive research speaking to how transit systems are not only safe, but free of most crime. Each of these themes is described and evaluated below.

Background & Statistics of Crime on Transportations Systems

Statistical data often reveals how positively or negatively citizens are able to judge particular events and actions. Although crime on BART was down 9% in April 2018, a significant amount of crime continues to occur and needs to be addressed. "A total of 137 violent crimes were reported on BART through April 2018 compared with 150 for the same period in 2017. There were 92 robberies reported through April compared with 110 at the same point last year" ("Robberies and violent crime down on BART amid increase in felony arrests | bart.gov", 2018). While overall crime is down, there is still a serious issue when it comes to violent crimes.

Theft can be combated by knowing when and where it is most likely to happen. "...CCTV and private security guards, this kind of town centre management is not just designed to mop up crime or social disorder, rather it is geared towards anticipating and preventing it" (Ken, Greenhalgh, 1996 p.36). Knowing when and where certain crimes will occur is not always possible, but even reducing the number of thefts may increase the public's perception of safety

on transit systems. When evaluating public transportation and crime that occurs on public transportation, it is critical to understand that “high passenger density offers natural anonymity and reduced likelihood of detection. Moreover, individual predictor variables such as paid control gates, better lighting or the presence of CCTV may impact on more than one of the above classifications” (Newton, Partridge & Gill, 2014). Police are unable to predict when and where crime is going to happen, but they are able to guess where crime is more likely to occur.

Transit systems provide a unique challenge when combating crime and ensuring the safety of its passengers. “The system congregates a number of different persons including ‘demographically high-crime-risk people’ such as teenagers, unattached males and those of low socio-economic status, and these users of the system constantly interchange” (Newton, Partridge, & Gill, 2014). Having people from every socio-economic level proves a challenge for mass transit police. Traditional police forces have to deal with different economic groups, but not all in one area such as a rail car.

Transit Police should consider using a crime mapping tool, as being able to add additional forces to the most needed areas is a way of combating crime at the source. “Levine and Wachs found that 22 percent of all recorded bus stop crime in West Central Los Angeles occurred at only eight locations. Similarly, Loukaitou-Sideris found that 18 percent of crime at inner-city Los Angeles bus stops was associated with only 10 unique 'hot spots'. Finally, Newton found that 70 percent of all incidents of bus-shelter vandalism in Liverpool (UK) occurred at 25 percent of all shelters throughout the city” (Newton, 2014 p.3). With a data driven population, transit systems are required to answer to the public. It is important for transit system

organizations to show the public what they are doing when working towards solving crime trends. One way is to use a crime mapping tool that highlights the more vulnerable areas.

Crime & Public Transportation

Public transportation reflects an area's population and inside any transit system this is multiplied and magnified. Public transportation is the life line of metropolitan areas and if plagued with crime, people are going to avoid it at all cost. "Commuters, tourists, and transit-related businesses are indicators of a community's economic vitality and the closing of transit lines can have serious economic repercussions" (Waugh, 2014). The transit system of a metropolitan area is the life line to move people and goods around.

"Transit shapes the crime pattern of the city by moving large proportions of high-risk populations around the city along a limited number of paths and depositing them at a limited number of destination nodes" (Liggett, Loukaitou-Sideris-Siders & Iseki, 2002). This allows criminal populations more access to a higher number of people. "...awareness spaces and target search points become tightly clustered Transit shapes the types of crime that are likely to be committed, by shaping the opportunity and the getaway potential of high-risk populations" (Liggett, Loukaitou-Sideris-Siders & Iseki, 2002). With crime being more prevalent in these areas, it is important to have more officers or deterrents present.

"The fear of becoming the victim of a crime is a widely known phenomenon, which, as psychological studies show, will often impair the quality of life of the person affected" (Bug, Kroh & Meier, 2015, p.67). People will find other avenues of getting around and avoid using public transit if they fear becoming a victim. "When riders perceive a transit system as unsafe, they will not use it, no matter what claims statisticians or civic leaders make to the contrary"

(Nelson, 1997 p.1). When transit systems are perceived to be unsafe, there will be a decline in ridership until that stigma of is fixed. “The fear rather influences people not to choose transit. This negative change of passengers’ attitude will have a negative impact on the regional environment which is associated with increased number of criminal incidents and it will be a vicious spiral” (Di, 2017).

One of the most important effects that a decline in ridership can have on a transit system is the dwindling income that goes with a decrease in ridership. “While the operating environments, organizational structure, and funding picture for each of the Top-Ten system is unique, the ridership losses at the San Francisco Muni are representative of the overall declines among the nation’s largest transit system” (Taylor, McCullough & Legg, 2008 p.29). Over the next few decades, the need for transit systems will continue to rise as the development of the areas will continue to rise. “Between 2015 and 2050, more than two-thirds of all nonresidential development will be redeveloped or otherwise repurposed” (Nelson, 2017). When people are not taking public transit in major metropolitan areas, congestion will continue to rise.

Crime Issues & Innovative ideas on Public Transit

Since 2001, there has been a larger need for security on mass transit, as there has been more scrutiny of terrorism. “Most public transit users, or would-be users, are not thinking about the threat of terrorism when deciding if they should use their own mode of transportation. Instead, they are concerned about general convenience as well as perceived crime and disorder that surround public transportation. Violence and disorder, whether actual or perceived, undermine the value and potential for public transit” (Kooi, 2013 p.821). Crime is

something that should not be considered when people are trying to get to around using mass transit.

The need for public transportation to be safe and reliable will continue to rise as populations rise. "People in cities depend on reliable, affordable, safe, and secure public transportation. Unfortunately, this is not always the case. Vandalism and pickpocketing are common in some transport facilities, and public transport has also proved to be attractive targets for criminals" (Hagen, Valdal, Pettersen & Gjerstad, 2014 p.823). The need for more criminal deterrence is important as the number of crimes has increased since the September 11, 2001 attacks. "In the past 40 years, only one person has died because of a terrorist attack on a rail target in the US, while the long-term increase in the number of lethal attacks on buses and trains worldwide indicate a need for more security measures" (Hagen, Valdal, Pettersen & Gjerstad, 2014 p.824). Placing appropriate security measures on mass transit will not only make it more difficult for criminals to operate, but it will also make public transportation less attractive targets of terrorism.

Public transit is unique due to the fact that their police jurisdiction runs through other police jurisdictions. "Today, it is now common for transit companies to hire their own transit police or contract private security companies for full-time deployment in response to increased crime and public concern surrounding public transportation" (Kooi, 2007 p.2). Transit systems have their own police force that is charged with maintaining order and deterring criminal activity on the transit system. "These patrols include fixed-post assignments at heavily trafficked transit centers, task forces, truancy sweeps, and a variety of other 'high visibility'

strategies. Several research studies have found that basic problem-solving approaches have had a dramatic impact on crime within public transit” (Kooi, 2007 p.2).

Knowing where to deploy forces is important and using data driven tools can allow transit police force to utilize their assets effectively. Transit police have a unique challenge ahead of them due to their jurisdiction being so spread out. Knowing the general vicinity where crime is committed is more important than pinpointing the crime itself. “Much recent criminological research focuses on places where past crimes have occurred, and on increasingly smaller ‘micro’ areas, such as block faces” (Yu & Smith, 2014 p.197). Today’s technology has come a long way, but there is still a need for police to be involved.

“While this approach is useful, it does not always address the concerns of public transit policymakers, particularly where place of occurrence is only one of the important factors that needs to be considered” (Yu & Smith, 2014 p.197). Crime data will influence how policy is written. People such as uniformed police that are visible and reachable gives the psychological deterrent that can help prevent crime in the first place.

Citizens who are already vulnerable will continue to have their vulnerabilities compounded until crimes are reduced. “Research also indicates that one dimension of fear of crime appears to be related to the respondent’s perceived likelihood of victimization. And perceived vulnerability can be related to signs of crime or disorder, and to possible limitations in one’s ability to thwart personal victimization” (Yu & Smith, 2014 p.196).

Crime Statistics

The Bay Area Rapid Transit system indicates that their numbers are improving in regards to theft and other violent crimes. “The latest numbers show the overall violent crime rate on

BART through April is down 9% compared with the same period in 2017. A major factor in that is a 16% drop in the number of robberies" ("Robberies and violent crime down on BART amid increase in felony arrests | bart.gov," 2018). It is important to know that when more active patrolling is conducted by the BART police department, crimes are reduced and citizens are about 9% safer ("Robberies and violent crime down on BART amid increase in felony arrests | bart.gov," 2018).

"Through April, BART police made 148 felony arrests and 410 misdemeanor arrests. That's a 16.5% increase in felony arrests. BPD reported 127 felony arrests and 390 misdemeanor arrests through April of last year. 2017 was an active year for BPD as the agency saw a nearly 40% surge in arrests from the previous year" ("Robberies and violent crime down on BART amid increase in felony arrests | bart.gov," 2018). The Bay Area Rapid Transit system is working to improve the safety of its riders. Even as the organization pushes to improve, they always seem to simultaneously take steps backwards. "While overall violent crime is down, aggravated assaults increased from 34 through April of 2017 to 43 for the same time frame this year" ("Robberies and violent crime down on BART amid increase in felony arrests | bart.gov," 2018).

One of the ways that Bay Area Rapid Transit plans to improve is by upgrading their security system and adding more officers with their increased \$25 million-dollar budget for the next year. "Over the past two weeks, BART staff has done a top-to-bottom security review and came up with a 12-point action plan costing roughly \$28 million to improve safety now and in the future. It's considered critical to combating crime" (Jarosz, 2018). The Bay Area Rapid Transit system knows there are a lot of issues and shortcomings when it comes to their

passengers' safety. These are steps in the right direction, but the transit system must go outside of their organization to conduct an assessment of the security system they have in place.

"Technology is also taking part in suppressing the capacity to violate rules, with adverts such as closed-circuit television CCTV and biometric measures reducing the opportunity for crime" (Ariel, Bland & Sutherland, 2017).

"BART PD has an authorized staff of 296 employees, 206 of which are sworn police officers" (Jennings, 2014). BART has its own police force that is responsible for keeping the nearly 400,000 daily commuters safe. "'We're hoping our riders will see and feel that we are responsive,' BART spokesperson Alicia Trost said. 'We are working to improve safety'" (Jaroz, 2018). These responses came after three murders occurred on the transit system. "'Having more officers at every point in the system absolutely helps being in the right place at the right time,' Trost explained. 'It makes us able to act quickly hold a train if we need to, take someone into custody, witness fare evasion and act appropriately. Those are the benefits of being able to have more boots on the ground'" (Jarosz, 2018). There have been many vacant slots for the police force that helps keep the transit system safe. In fact, there have been up to 40 and as little as 28 openings (Jarosz, 2018).

There are ways to get around increasing police presence. One of the proven ideas is to add private security guards. "Analyses show that 41% more patrol visits and 29% more minutes spent by security agents at treatment compared to control stations led to a significant 16% reduction in victim-generated crimes at the entirety of the stations' complexes, with a 49% increase in police-generated detections at the target locations" (Ariel, Bland & Sutherland,

2017). With goals to reduce crime, this is an ideal option that will not cost as much as a BART police officer.

Conclusion

“BART riders cover about 57% of operating costs, so strong ridership is a critical element of system finances” (Deakin, Payne & Menotti, 2004). People will choose how to get to work based on a few different reasons. One of these factors is safety. “The choice of the type of transport to be used by the user is based on the search for convenience, freedom of movement and often, the most preponderant indicators are the time, safety and quality of the services offered by the companies” (Tomaz de Aquino, Valença de Souza, Lima da Silva, Jerônimo & Melo, 2018). With many well documented issues on the Bay Area Rapid transit system, it makes sense that people are looking to find other ways to get to work. “Thus littering, vandalism, or homelessness around stations could increase citizens’ safety concerns” (Ciorici & Ludwig, 2009). Basic needs have to be met in order for people to have a safe and functional public transit system in today’s world. “Unless both security and justice are guaranteed – reflecting humanity’s yearning not only to survive but to thrive with dignity – neither security nor justice is sustainable over the medium to long term” (Durch, Larik & Ponzio, 2016 p.96).

For Africa and their first bus system in Nigeria, safety was one of the most important concerns that travelers had. “Safety. Incidence of crime, ranging from theft to physical abuse, was high while riding on and waiting for transport vehicles. The disorder and chaos that surrounded public transport were seen to give opportunity to criminals; the almost constant intimidation and general chaos were seen to lead to undue stress for travelers (Kaenzig,

Mobereola & Brader, 2010). The need for security is key for people who want to use and do currently use public transportation.

Chapter 3- Research Methods

Introduction

The research was conducted with multiple methods to include a survey and a structured interview with two subject matter experts from the Bay Area Rapid Transit system. The survey was campaigned using social media such as Facebook, Next Door and LinkedIn. The goal was to reach as many people as possible that have used the Bay Area Rapid Transit system. I was able to reach 291 people who reside in or around the San Francisco Bay Area. The purpose of the study was to try and identify factors contributing to the decline of ridership on the transit system and to come up with possible solutions. This chapter covers the research hypothesis, operational definitions, data plan collection overview, population sampling strategy, internal and external validity, limitations of the study and the conclusion.

Research Hypothesis

Reducing crimes and increasing safety on the Bay Area Rapid Transit system will lead to greater user confidence and increased passenger ridership. When initially organizing this research, it was important to gather as much information as possible pertaining to why there was a decline of ridership on the Bay Area Rapid Transit system. To be sure that there was a catch all in the research, an "other" box was included in the survey so people could type in reasons not already listed.

The research ideally needs at least two sides or perspectives to ensure accuracy, so conducting a structured interview and allowing people to expand on anything they wanted was

important. The goal of the survey was to include people who have access to the Bay Area Rapid Transit. This way, the research has opinions from a diverse background of the region's population.

Dependent and Independent Variables

The dependent variable examined in this study was increased passenger ridership on the Bay Area Rapid Transit system. The independent variable examined in this study was crime committed on the Bay Area Rapid Transit system. The independent variable has a direct effect on the dependent variable. If crime was reduced, according to the research that was conducted, then ridership would increase. If crime was to rise, then ridership would decrease.

Operational Definitions

BART: Bay Area Rapid Transit is a light rail transit system local to the San Francisco Bay Area in California.

Safer Trains: Crime reported on trains is down 50%, which may indicate that they are safer than they had been in the past. More importantly, serious crimes such as assaults and murders are down 50%. Measuring this will take a year and need to include improvements of the police force that is tasked with keeping the Bay Area Rapid Transit system at full strength.

Safer Stations: The vicinity in and around the stations is the area that will be measured to determine whether there is an actual reduction in crime. The reported crime in and around stations is down 50%, which indicates that these areas are becoming safer. More importantly,

serious crimes such as assaults and murders need to be down 50% as well. Assault and murder are more at the forefront of the public's thought and concern in regards to crime when compared to misdemeanors and petty theft. Measuring this will take a year and need to show improvements of the police force that is tasked with keeping the Bay Area Rapid Transit system at full strength.

Greater Ridership: Patrons that spend money to ride from one station to their final destination on BART. Greater ridership will be defined as a 3.1% increase of paid patronage over the course of the next year.

Commuting Workforce: People who do not live in the same area as their work and are required to travel from their home to their place of work.

Data Collection Plan Overview

Population Sampling Strategy

Data was collected from people who ride the Bay Area Rapid Transit system and people who choose not to ride the system. The goal was to get 200 responses to a survey conducted from 1 February to 10 February. Using social media tools such as Facebook, LinkedIn and Next Door, I was able to post the survey and have people in the local area respond. By posting this survey on social media, I was able to get in contact with people who work for the Bay Area Rapid Transit system and send them the structured interviews. Interviewing these people gave multiple perspectives on the issues surrounding decreasing ridership on the Bay Area Rapid Transit

system. Sending out structured interview questions allowed these subject matter experts more time to formulate their answers.

Having a general grasp of the data is important, but it is even more critical to interpret and apply the data to something that is useful for the organization. Data driven results that correlate data to problem solving is a skill that is in high demand. Taking data that was collected from the survey allows the end user to see how people ranked the issues that surround the decline of ridership on the Bay Area Rapid Transit system. This part of the data collection is the quantitative study and gives validity to the qualitative part of the study, which is the structured interviews.

Fixing everything that is wrong with the Bay Area Rapid Transit system all at once is an unachievable goal, but working on one or two issues at a time is an achievable one. Fixing the top one or two issues can have a trickle-down affect over issues surrounding ridership on the transit system.

Controlling for Internal and External Validity

Internal validity is the design of the research and how correct it is. Guaranteeing the correctness of the study gives research weight. By also listing the shortcomings of the research, it gives the research validity. There are different factors that can affect the research, which include any new developments that happen on the Bay Area Rapid Transit system. This includes the social economics near the stations and the staffing of the Bay Area Rapid Transit police. Another issue that may arise during research is people telecommuting more than they have in the past.

This research should have external validity with transit systems of similar sizes. Assessing crime rates against ridership rates enables the measurement of successes and failures of the Bay Area Rapid Transit system. Using another light rail system could be possible as long as it has similar ridership to the Bay Area Rapid Transit system.

Limitations

There are limitations to this study. Due to time restraints, there will not be a measurement of success. Rather, it will be a hypothetical response from people on whether they would ride the transit system if it was cleaner and safer.

Conclusion

The ability to have cleaner and safer Bay Area Rapid Transit stations and trains should lead to greater ridership. The BART Watch application could help with this, if properly administered. There also needs to be a baseline understanding when reading this proposal and research. A cleaner transit system means a reduction in needles and a more sanitary system. Giving the transit system a benchmark to measure itself by is also important. Safer means a reduction in crime is reported and more specifically, a reduction in assaults and murders. Ridership increasing back to the numbers that the Bay Area Rapid Transit system had in the past is key to ensuring that there are enough funds to keep the system running long term. Getting back to those increased ridership numbers is important for conducting this study and for measuring successes or failures.

Realizing that some of the issues will not be addressed in this study is important because they may exemplify why people have decided to take other modes of transportation. The ability to work from home is something that is fairly new over the last few years and will

continue to grow in popularity. Measuring other transit systems' crime and cleanliness issues is important to evaluate successes or failures. Finally, knowing what the limitations of the study were helps other researchers understand how these results were determined and how to improve studies like these in the future.

Chapter 4 – Results and Findings

The research question examined in this study was the extent to which reducing crimes and increasing safety on the Bay Area Rapid Transit system will lead to greater user confidence and increased passenger ridership. The goal was to find a cause and possible solution for the decline of ridership on the Bay Area Rapid Transit system. Survey data was collected from 291 respondents via a questionnaire posted on social media platforms. The research hypothesis of this study is: Reducing crimes and increasing safety on the Bay Area Rapid Transit system will lead to greater user confidence and increased passenger ridership.

This chapter provides a review of the research methodology, the questions asked in the survey, the findings and the structured interviews plus answers. Primary data and analyses are provided below.

Overview of Methodology

Primary data for this research was collected in the San Francisco, California Bay Area and the study specifically targeted people who currently use or have used the Bay Area Rapid Transit (BART) system. The survey was distributed via Facebook, Next Door and LinkedIn social media platforms. Using social media allowed for more people to take the survey on their own time and convenience.

A survey goal was to be as unbiased as possible. One of the ways this was done was by allowing people to provide personal comments using a comment box. The structured interviews were completed via electronic mail in a three question Word document that allowed the interviewee to fill out as much or as little as they wanted. This also allowed the interviewees to guide the interview into areas that they knew a lot about.

Survey Questions and Results

Question 1: Have you ever used BART?

Figure 1 shows that almost all (96%) of the survey participants used the Bay Area Rapid Transit. This indicates a strong validity that personal first-hand knowledge of the Bay Area Rapid Transit system is provided for this study. Only 4% of the survey participants had not used the Bay Area Rapid Transit before.

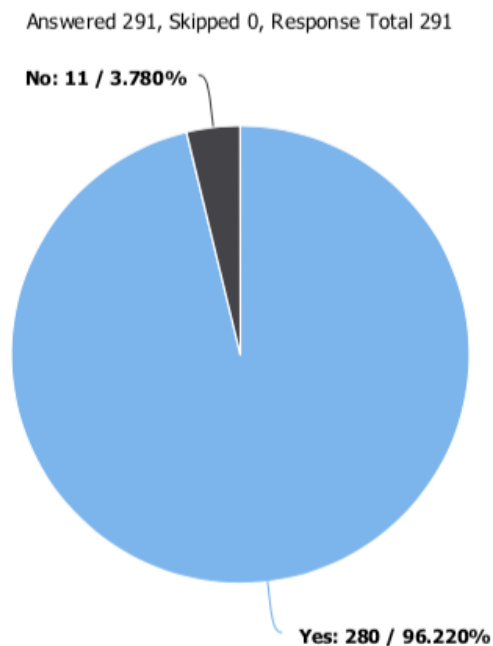


Figure 1

Question 2: What method of transportation do you use around the Bay Area most frequently?

Figure 2 depicts the primary transportation method used in the San Francisco Bay Area. The number one response (almost 86%) to this question was driving personally owned vehicles. The second most frequent response was using the Bay Area Rapid Transit system, about 17%. The 'Other' section was about 3% and mostly consisted of respondents taking the bus.

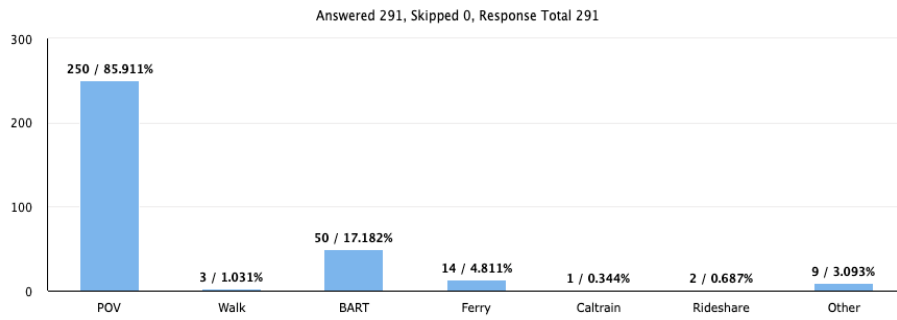


Figure 2

Question 3: BART is available to me, but I choose not to use it.

Figure 3 shows the number of respondents who have access to the Bay Area Rapid Transit and whether they choose to use it or not. This was a very interesting question because it shows that almost 53% of people could take the Bay Area Rapid Transit, but they chose not to. The other 47% of people cannot take the transit system for one reason or another.

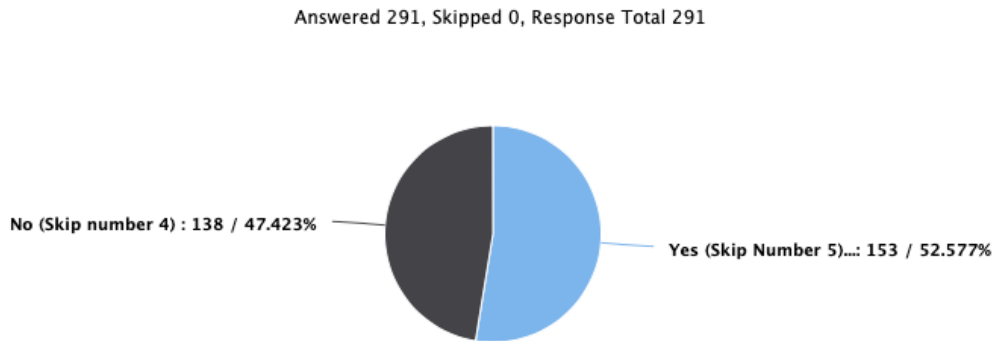


Figure 3

Question 4: What is the main reason you chose not to use BART?

Figure 4 prompted the main reason that participants choose not to use the Bay Area Rapid Transit system. The top reason for respondents that can use the transit system and choose not to is crime, which made up about 27.5%. The second reason was due to convenience, which made up just under 26%. About 18% of respondents that filled in the 'other' section stated that it was not close enough or that it was not convenient. Few in the 'other' section stated that it was all of the above. 11.5% chose not to ride the transit system because of the poor infrastructure. Four other choices (cost, difficult parking, safety and health concerns) made up 5% or less.

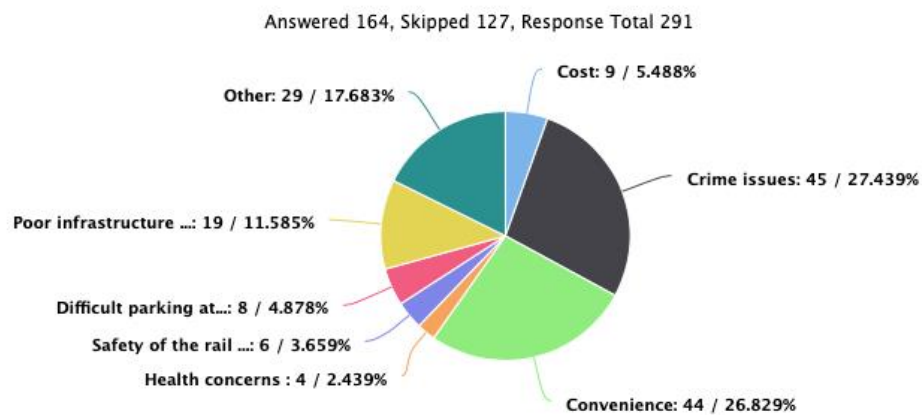


Figure 4

Question 5: On average, how often do you use BART?

Figure 5 gives a base line on how often participants take the Bay Area Rapid Transit system. 58% of respondents take the transit system periodically each year. What also can be assessed from this is that over half of the participants avoid taking the transit system when they could be using it. The next most frequent answer was periodically each month and that was 14%.

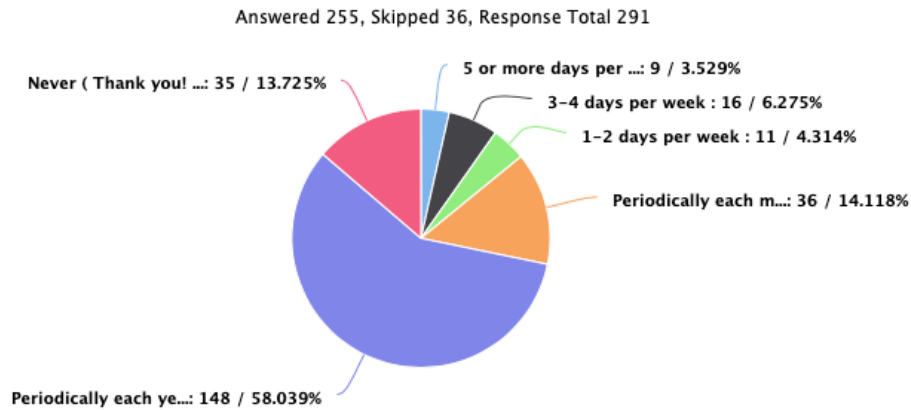


Figure 5

Question 6: Are you using BART less, more or about the same frequency than in the past couple of years?

Figure 6 demonstrates the decline in ridership by the participants. Of the almost 300 people that took the survey, more than half or about 54% are taking the transit system less. The population that took this survey helped prove that there may be an even larger decline in future ridership. This can be attributed to crime on the transit system and the lack of convenience for people traveling throughout the Bay Area. The Bay Area has a lot of jobs and they are located in a few areas that require commuting. The answer of taking the transit system more should be the most popular answer, but it only makes up 9.5%. The second most frequent answer was “about the same,” was selected 36.5% of the time.

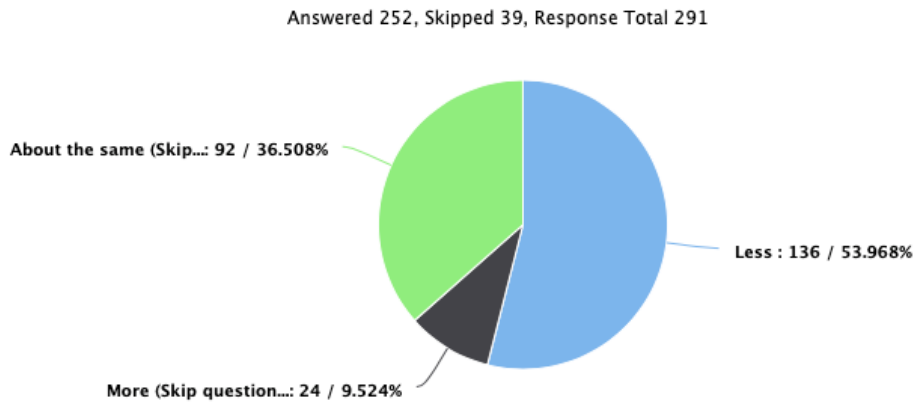


Figure 6

Question 7: If you are taking BART less frequently, why? If not please skip.

Figure 7 shows the reasons for those who have chosen to ride the Bay Area Rapid transit less. During the initial research phase, there were a few reasons why people may have been riding the transit system less. Asking why people were riding less frequently was a key part of the research. About 23% of respondents are worried about safety of the trains, followed by almost 20% concerned about crime. The third reason or 17.3% was that the transit system is not convenient to use and does not reach a large part of San Francisco. In the ‘other’ section, about 15.5% of respondents wrote in “all of the above.” About 50% of respondents demonstrated concern regarding the homeless population in the ‘other’ section as well.

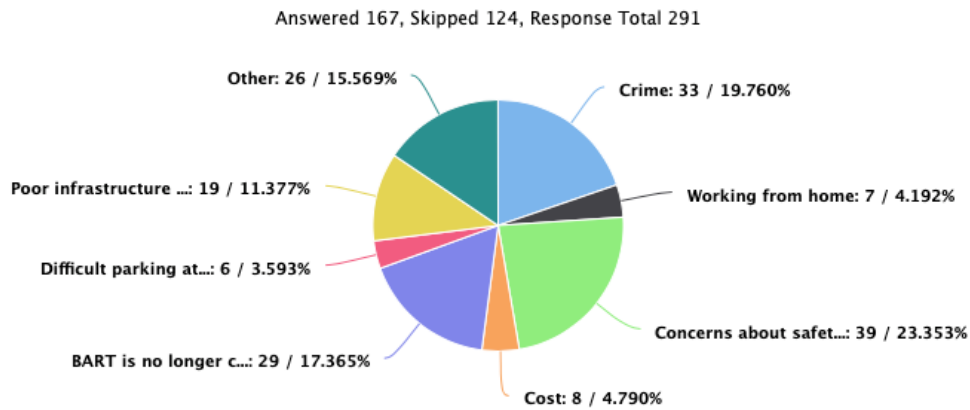


Figure 7

Question 8: In the last few years, did you use BART more or less on the weekends?

Figure 8 showed whether riders were using the Bay Area Rapid Transit system more, less or about the same on the weekends. While conducting research of why people are riding the Bay Area Rapid Transit system less, the largest loss of ridership was on the weekends. By asking respondents the frequency in which they use the Bay Area Rapid Transit on the weekends, I was able to confirm that people are riding the transit system less. Almost 35% of respondents answered that they are riding the transit system less on the weekends. 20% stated that they do not ride the transit system on the weekends. 33.3% of respondents selected that they ride the transit system about the same as before on the weekends. Only 11% chose the answer that they ride the Bay Area Rapid Transit system more on the weekends. With all of the activity that the Bay Area offers, there should be a rise of people taking the transit system, not a decline.

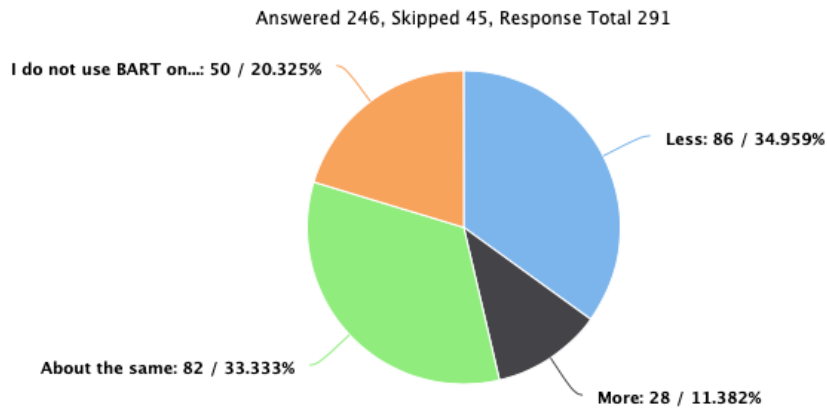


Figure 8

Question 9: If BART could improve in one area, what would it be?

Figure 9 reveals respondents' answers to the question of what would be one thing that the Bay Area Rapid Transit system could improve? In order to start increasing ridership rates, the Bay Area Rapid Transit system needs to know why people are avoiding the transit system. Being able to rank what people are most worried about is key. For over 38% of the population, the answer to this question was safer/less crime as the number one reason for avoiding the transit system. The second reason, which was about 20% of respondents, was the need for cleaner and safer trains. In the 'other' section, about 16% of total respondents wrote "all of the above" or both crime and cleaner trains. About 50% of respondents selected the 'other' section and pointed out the homeless population issue and the littering of needles as their main concern. About 13% want the transit system to be more convenient and almost 7% want better pricing. The last answer was infrastructure, which made up about 5% of the responses.

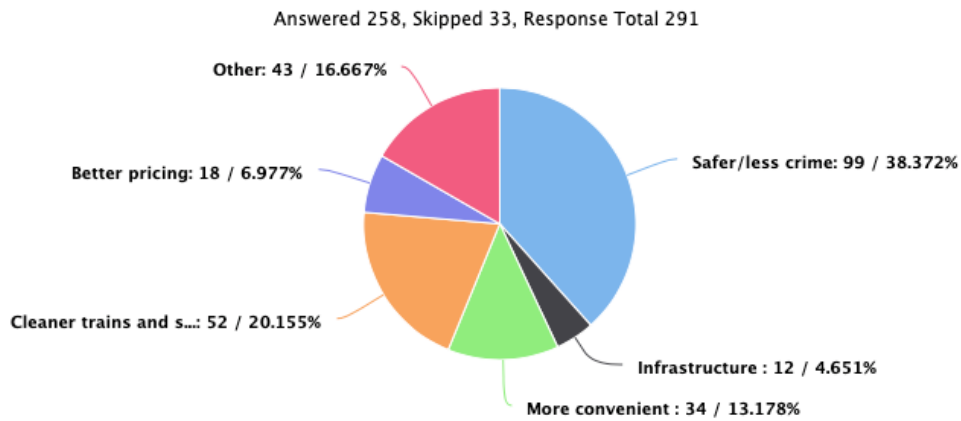


Figure 9

Significant Survey Data Findings

The survey data indicates fewer people are riding the Bay Area Rapid Transit. A majority of respondents (53%) can take the transit system to get to and from work, but choose not to. Most of the respondents (58%) took the transit system periodically each year. They are avoiding Bay Area Rapid Transit for mostly one of two reasons- crime (about 26%) and convenience (about 27%). Another interesting fact is that more respondents (55%) are optioning out of riding the transit system on the weekends. Furthermore, over 38% of respondents that took the survey thought that the one area that the transit system needed to improve on reducing crime.

Structured Interview Data and Analysis

Question 1: Why do you think there has been a decline in BART ridership in the last three years?

Subject 1:

The decrease in ridership is attributable to a host of reasons. When examining the decrease in ridership, it is apparent that the largest percentage of loss has been during weekends, non-commute hours, and late at night. For instance, the number of weekend riders on BART has been reported to be lower by up to 12%. Are people not traveling as much? I think the real answer is that respondents have found alternative modes of travel.

Ridesharing with Uber and Lyft has replaced Bay Area Rapid Transit for many people as well, especially for shorter (inner city) trips. Those patrons who have the luxury of having alternative modes of transportation will use their discretion. BART, like other transit systems, must rely on a large percentage of patrons who have the option of driving. Driving a personal vehicle provides some isolation from the criminal element, safety and quality of life issues.

I truly believe there is a tipping point. When the perception of safety, or lack thereof, reaches a certain point, people will make decisions to find alternatives. The alternatives are easier to discern given the cost of taking BART. The cost of a roundtrip fare from Fremont to downtown San Francisco is \$14.50 for adults, \$72.50 per work week.

Riding BART will expose people to the issue of homelessness in the Bay Area. I have observed first-hand a degradation of certain customary habits like using restrooms to defecate or urinate. Riders are hard pressed to find a train that does not have a puddle of urine, vomit, or feces. The trains are not clean.

Subject 2:

I think there are many factors, including the relative ease and affordability of TNCs. In addition, the Bay Area housing and homeless crisis has shown up on BART. The increased presence of homeless people in BART cars and stations creates an atmosphere that many respondents are not comfortable with. I think many people feel like it is a “kill joy” for an experience in San Francisco. Much of my family would avoid taking BART on a trip to San Francisco for this reason. At best, it is depressing to encounter so much homelessness while on the trains and in the stations. At worst, people may experience frightening or gross encounters with other passengers or homeless people, such as people throwing up, defecating, etc.

Question 1 Analysis:

Both interviewees agreed that crime is an issue that affects ridership. According to subject one, crime is more prevalent on the weekends and in the late evening. The issues that surround the Bay Area Rapid Transit system, especially regarding the homeless population, make it hard for people to ride the system. When riders are confronted with the issues that surround the homeless population, it makes traveling more difficult and people will find other, more private modes of transportation such as ride share to get around. When people are going to and from an event, they will avoid a system that exposes them to the homeless population who are unclean and more than likely unhealthy. Both subjects believe that there needs to be a clean-up of crime on the Bay Area Rapid Transit in order for people see it as a reliable option.

Question #2: What can BART do to reduce crime on trains and at stations?

Subject 1:

BART needs to hire qualified law enforcement officers. They are currently down 30 officers. BART also needs to deploy officers differently, as the officers need to be physically present on trains much more than they are. BART Police used to utilize plainclothes officers in stations to do fare evasion enforcement and other criminal enforcement. This is rarely done now.

Like other police departments across the nation, there has been a media driven perception that police are brutal, arbitrary, and racist. BART's former Chief of Police and Deputy Chief created an atmosphere of enforcement of officer misconduct, so officers soon realized that if they do nothing, then they don't get in trouble- they then chose to hide. This atmosphere has slowly been changing with Chief Rojas who understands how difficult it is to be an officer nowadays. He does not tolerate wrongdoing; however, he gives officers the benefit of a doubt when it is reasonable to do so.

Subject 2:

BART needs to have more of a physical presence at the stations and on the trains. BART staff needs to patrol along with BART police. They should also advertise their BARTwatch app more so people know they can report things discretely.

Question 2 Analysis:

Both subjects think that there is an issue with the lack of Bay Area Rapid Transit personnel or police force being present on the trains and at the stations. Another key point that was brought up not only during these interviews, but also during the survey was that respondents rarely see the transit system's police force. They can be seen around the system, but not riding the trains. With the negativity from the media that has surrounded the police force, it is more important for officers to be visible and be seen riding the trains. By getting out and interacting with the public, the stigma of the transit police force being corrupt will dissipate. There seem to

be cultural issues in the police force that need to be fixed. Changes in culture take time to improve if done correctly from the ground up.

Subject 2 brought up the BARTwatch application that can be downloaded to a smartphone. The Bay Area Rapid Transit system should consider what Subject 2 suggested by doing an advertisement campaign to help inform the public. The Bay Area Rapid Transit system should also be more transparent on how well the transit police respond to these alerts. There are two reasons that the transit police should be transparent. The first is that it shows the transit police are doing their job correctly. The other is that if they are failing to show up to these alerts, it shows that there is a need for help. With BART down 30 officers, there are going to be holes that cannot be filled by overtime alone. The workload does not change based on how many officers are working for the transit system. When the Bay Area Rapid Transit police officers may look for work elsewhere, somewhere they are not over worked.

Question #3: What can BART do to increase ridership?

Subject 1:

It is critical to clean the trains more often; increase police presence on the trains especially at night and on weekends; and rollback fares to a more reasonable level. Patrons often complain that they never see an officer on the train. BART upper management and the Board of Directors need to ride the trains at night to fully understand what is going on. They need to feel how unsafe the trains are in order to implement significant change in how the police department staffing is utilized.

Subject 2:

It may be worth offering family discounts on the weekends and partnering with Lyft and Uber to get discounts so people can access BART without having to park there. Improving cleanliness is key, as well as accelerating the new rail car replacement.

Question 3 Analysis:

Both subject matter experts stated that the trains need to be cleaned more often. They both stated that there needs to be an improvement of pricing to make it more reasonable. People are paying a decent amount to ride the Bay Area Rapid Transit system and they should expect a certain level of comfort and safety.

Summary of Overall Significant Findings

Respondents that ride or do not ride the Bay Area Rapid Transit system and those who work for the Bay Area Rapid Transit know that there is a problem with ridership. The most significant BART problem is crime. The perception of crime is so apparent that respondents avoid taking the Bay Area Rapid Transit system more than half the time. Because of murder, assaults, muggings and other crimes, people avoid using the transit system. Crime is not the only reason that respondents who can use the transit system avoid it. The other prevalent reason that respondents avoid it is the lack of convenience. When compared to other systems such as the New York subway system, the Bay Area Rapid Transit system does not get around the Bay Area that well.

Between the lack of manpower on the Bay Area Rapid Transit system and the poor perception of its officers, it makes it difficult to keep the Bay Area Rapid Transit system safe. When considering how to travel, something to contemplate is the value. In this case, the Bay Area Rapid Transit system's value compared to other transit values is lower. This is especially true when considering what people are exposed to on the Bay Area Rapid Transit. For example, drugs, exposed used needles, and defecation makes it an easy choice to take other modes of transportation.

Chapter 5 Conclusions, Recommendations, and **Areas for Further Study**

Conclusions

There are many conclusions that can be derived from this study and research that was conducted over the last 16 weeks. The top three include crime on the Bay Area Rapid Transit system, man power issues for the police force, and low ridership based on inconvenience. According to the research that was conducted for this study, 99 people or 38.4% of survey respondents chose to not ride BART because of the lack of security. 31 respondents specified that they not only avoid riding the Bay Area Rapid Transit system because of crime, but also because of the lack of cleanliness on the trains and stations.

The second conclusion is how the shortage of BART police officers is contributing to the high crime on the Bay Area Rapid Transit. The BART police force is currently short 30 officers. This accounts for 14.6% of the total 206 department of sworn officers and contributes to a slower response due to a lack of uniformed law enforcement personnel.

The third conclusion is that BART is not convenient. About 27% of surveyed riders claimed that access to the transit system was inconvenient. The major obstacle concerning rider convenience was a lack of parking near the BART rail stations. Lack of parking spaces has been a problem for BART for a long time and is not getting better. A second inconvenient issue revealed was transit system station routes. 44 or about 27% of survey respondents indicated that the BART does not serve their work, shopping or recreation destination needs and should expand their routes to more places.

Recommendations

The first recommendation is to hire more police officers to reach 100% manning strength. This action will take additional time and money, but in the end, will be well worth it.

The Metropolitan Transportation Commission needs to sponsor a Bond Measure to create this funding. With the influx of resources, the Bay Area Rapid Transit police can start to be a desirable destination for officers to work. Look into community outreach programs that cannot only help hire qualified officers but also, give the community confidence in the BART police force. Attending events in community colleges and other community events would be a start.

BART leadership with the Department of Human Resources as the lead office, should assess, analyze and determine a human capital resource plan to include incentives for officer hiring and retention. Management and union leaders should work collaboratively to hire the right type of individuals needed for these dangerous but rewarding jobs. Efforts to develop BART as an employer of choice may help change the culture of the BART police department into a more productive and responsive department.

The second recommendation is to have the Bay Area Rapid Transit police department ride the trains more often than they are now. Community policing strategies include the “presence” of uniformed police officers not just to react but promote and be proactive in preventing criminal activities. The goal is to facilitate more of a community police force rather than just a reactionary force. This is a recommendation that hinges on hiring additional qualified Bay Area Rapid Transit police officers. One of the interviewees indicated that the culture of the transit police needed to be improved. By hiring new officers that are willing to adapt to and operate in a new police culture, crime will be reduced, which may increase the public perception of the Bay Area Rapid Transit police department.

Areas for Further Study

An area that needs further study is the lack of convenience of the Bay Area Rapid Transit system due to limited service lines/routes. Scheduling and locations for routes are based on passenger ridership. Annual reviews should be done, which incorporate public surveys or a census on where the system should go along with adjustments to timing schedules. This is a major project, so a transportation management consultant should be hired to assist BART transit planners in determining population densities, new workplaces and commercial development areas. Making BART convenient will help increase ridership as long as BART is safe for people to ride.

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Appendix A: Survey Questions:

Question 1: Have you ever used BART?

Yes

No

Question 2: What method of transportation do you use around the Bay Area most frequently?

POV

BART

Walk

Ferry

Cal Train

Rideshare

Other

Question 3: BART is available to me, but I choose not to use it.

Yes

No

Question 4: What is the main reason you chose not to use BART?

Cost

Crime issues

Convenience

Other

Difficult parking

Safety of the rail system

Health concerns

Question 5: On average, how often do you use BART?

Periodically each year

Periodically each month

Never

5 or more days a week

3-4 days a week

1-2 days a week

Question 6: Are you using BART less, more or about the same frequency than in the past couple of years?

Less

More

About the same

Question 7: If you are taking BART less frequently, why? If not please skip.

Crime

Working from home

Concerns about safety

Cost

Other

Difficult parking at stations

Poor infrastructure

BART is no longer convenient

Question 8: In the last few years, did you use BART more or less on the weekends?

Less

More

About the same

I do not use BART on the weekends

Question 9: If BART could improve in one area, what would it be?

Safer/less crime?

More Convenient?

Cleaner Trains and stations?

Better pricing?

Infrastructure?

Other?

Interview Questions:

1. Why do you think there has been a decline in BART ridership in the last three years?
2. What can BART do to reduce crime on trains and at stations?
3. What can BART do to increase ridership?