

BART, HOW DID WE EVER SURVIVE WITHOUT YOU?

AN INNOVATION CASE STUDY

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"Fleet of the Future" Rendering of new BART Trains, courtesy of Bay Area Rapid Transit

"The fact that most Bay Area residents take the system for granted, grumbling when the train is delayed or too packed, is proof of how indispensable it has become"

Liam O'Donoghue
East Bay Yesterday Podcast Host

Arguably, BART (Bay Area Rapid Transit) has been one of the best investments in public infrastructure that Bay Area residents have ever made. Although not the first metro system in the world (London's Underground was built in 1863 and multiple others after that) nor the first in the US (Boston's was first in 1897 and New York's Subway was also before in 1904), BART was an innovation for the Bay Area (Brooks, 2017 & Oldest, 2018). The idea of an underground railway system was not new to cities globally; nevertheless, BART quickly innovated commutes, providing speedy transportation for more people at once without the traffic congestion that plagues buses and street cars. Despite some mixed success up to 1999 when it comes to densifying development, BART has been able to "spark new commercial and residential development around several suburban stations" and maintain San Francisco as the region's primary business and financial hub even with increased traffic congestion on roadways (Landis & Cervero, 1999). More studies on the last couple decades are yet to be complete, yet the expansion of BART seen today indicates more influence has occurred and is yet to come. Additionally, the American Public Works Association named BART one of the Top Ten Public Works Projects of the 20th Century in 1999. After it was built, BART "became the model to be followed by others including the Baltimore Metro, the Metropolitan Atlanta Regional Transportation Authority and the Los Angeles Metro," (American Public Works Association, 1999). By 1999, BART "carried more than 1.5 billion and a half passengers more than 18 billion passenger miles" (American

Public Works Association) and in 2019 alone 118 Million—totally in over 2.1 Billion rides from 1999-2019 (nearly 2/3s the time) (“Ridership Reports,” 2019).

Factors of Innovation

Many metros had been built in the world by the time BART came to be (Oldest, 2017), yet there were some technological advances that made excavation under San Francisco, with the high water table and the Transbay Tunnel more feasible in an environment that did not make the required excavation easy (“A History of BART,” n.d.; American Public Works Association, 1999). The construction of BART incorporated some novel engineering feats, such as being constructed under ‘compressed-air conditions’ and the incredible coordination needed submerge the Transbay Tunnel (under the Bay between San Francisco and Oakland) as well as through the rock of the Berkley Hills (“A History of BART,” n.d.; Bechtel, n.d.). At the time it was built, the Transbay “tube was the longest and deepest underwater tube tunnel in the world” (American Public Works Association, 1999). Yet, these technological advances were not the only factors that enabled BART’s success. It was the tax payers of the Bay Area that ultimately approved the plan for BART even in the face of increased taxes (“A History of BART,” n.d.; American Public Works Association, 1999). Thus there was demonstrated social and political support that had been building since a commission was first formed around the idea in 1946 (“A History of BART,” n.d.).

Mixed Success

Not all of BART’s history is a success story, however. Recognition for a mass underground rail transit system and planning began in 1946 due to a post war rapid growth population and an automobile boom, but not until many year later with multiple counties joining and then resigning from the effort was BART first open in 1972 (“A History of BART,” n.d.). Originally the plan was to have BART run across nine counties (Baldassari, 2019 & “A History of BART,” n.d.). As plans gained more traction the number reduced to five, and finally, San Mateo bowed out with Marin soon following after

BART Employees in the 70’s, courtesy of Bay Area Rapid Transit



Part of the Transbay Teriminal being lowered into the Bay, courtesy of Bay Area Rapid Transit

DIFFUSION OF METROS & THE FOUNDING OF BART

London Underground Opened	1863
Boston Subway Opened	1897
New York Subway Opened	1904
Cincinnati Subway Abandoned	1928
Bay Area Mass Rail Transit Envisioned	1946
BART Plans Approved for Construction	1962
BART Opens for first Riders	1972
BART Continues to add Lines and Stations	2020



BART On the first day of service, courtesy of Peter Breinig/The Chronicle

“Engineers incorporated the most advanced technologies and designed the system to capture the imagination of the public with an ultra-modern look including streamlined cars and stations that reflect the cultural diversity of the local communities.”

American Public Works Association
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the realization that they could not afford a tunnel under the Golden Gate bridge and the bridge could not support a new deck with trains (Baldassari, 201; “A History of BART,” n.d.). Thankfully, unlike another United States metro system project from a few decades earlier—in the Cincinnati, Ohio where construction was abandoned in 1928 after unforeseen rising costs (“Cincinnati’s Abandoned Subway,” n.d.)—BART survives to this day. BART’s plans for crossing three counties (San Francisco, Alameda, and Contra Costa) were finally approved in 1962 with opening day being ten years later (Baldassari, 2019; “A History of BART,” n.d.). Today, BART has yet to incorporate all the original counties. However, recently, San Jose has been added as the most Southern Stop (see maps), bringing Santa Clara County in the system and an updated fleet of trains (called “The Fleet of the Future”) based on over 3,000 user surveys are bringing about the next era for this Bay Area Icon (“New Train Car Project,” n.d.).

Diffusion

Despite all the converging factors for success in creating BART, only time would tell if the system would be integrated into the daily lives of Bay Area residents, truly changing the way people move about and relate to their environments. According to Everett Roger’s classic book, *Diffusion of Innovations* (2003), there are a number ‘attributes’ associated with successfully diffused innovations: ‘relative advantage’, ‘compatibility’, ‘complexity’, ‘trialability’, and ‘observability’.

Given long commutes into and around large cities, mass transit can have a huge ‘relative advantage’ (Rogers, 2003) over other forms of transit, particularly automobiles. First, a car can be seen as a liability especially in highly populated and compact cities like

San Francisco and Oakland. There is a concern of parking and fees but also of theft. Additionally, people who live in these areas do not often own cars for these reasons and financial reasons. Furthermore, transit can provide a moment for the rider to read or prepare for a meeting among other tasks. In terms of ‘compatibility’ (Rogers, 2003), “engineers incorporated the most advanced technologies and designed the system to capture the imagination of the public with an ultra-modern look including streamlined cars and stations that reflect the cultural diversity of the local communities” (American Public Works Association, 1999).

Governor Jerry Brown of CA, using BART ticket machine, courtesy of Micheal Healy/ The Mercury News



Moreover, when the voters originally sanctioned BART, 61% of voters approved (“A History of BART,” n.d.) which is far more than the 10-20% often required to diffuse an innovation (Rogers, 2003). Of course, someone who voted for BART is not a guaranteed match for riding BART, yet we can probably safely assume that a majority of the population found the proposition of a mass transit underground railway compatible with their worldviews.

With regard to ‘complexity’ (Rogers, 2003), from the Beginning BART had IBM design automated ticket machines that ensured the rider only had to pay for the length of their trip (“A History of BART,” n.d.). It is difficult to say how complex these early machines were for early riders (or other aspects of travel), but we can say that improvements have been made along the way that enable ever simpler rides now enabled by “Clipper Cards” that are usable on public transit throughout the region or even a mobile app (“Tickets and Clipper,” n.d.). Then, of course, BART’s ‘trailability’ (Rogers, 2003) is higher as you can ride it without major commitments any day. The ‘observability’ (Rogers, 2003) is high given that it is a massive piece of public infrastructure (albeit mostly below ground) with public access and centralized locations. Moreover, there were public figures that fall under Roger’s (2003) description of ‘opinion leaders’ that helped influence people’s willingness to try BART, including Prince Charles of Wales, President Nixon and his wife, Pat, and Governor Jerry Brown (Baldassari, 2019; “A History of BART,” n.d.). All of these ‘attributes’ combine to increase the chances that BART would diffuse into wide use rapidly.

The Future of BART

It would be amiss to write out BART in 2020 and not mention the perils of the Corona Virus which has for the time made public transit a less viable option for most (due to the ease of the Virus transfer with many people in a confined space). Nevertheless, BART keeps running with limited schedule for ‘essential workers’

(such as those who work for grocery stores or those who operate BART) (“BART Updates Related to Coronavirus,” 2020; Dowd, 2020). This development confirms the vital role BART has in Bay Area transportation. There may be additional precautions and inventions that ease people back into the use of BART, other metro systems, and public transit in general, but this innovation seems more likely to continue to expand with the Bay Area population and the dawning of the Climate Change Era. Amidst the reinvention, incremental improvements, and innovations of many systems and with the heightened need cooperation amongst transit networks (Bliss, 2020), it is apt to wonder—about BART and many other pieces of infrastructure that we heavily rely on—how could we ever survive without you?

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Original BART Map, courtesy of Bay Area Rapid Transit



2020 BART Map, courtesy of Bay Area Rapid Transit

