Unlocking SEPTA Key:  
An Analysis of the Decisions Leading to a New Fare Medium

by

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ABSTRACT

The Southeastern Pennsylvania Transportation Authority (SEPTA) is the sixth largest transit agency in the United States, serving 358 million passengers annually (APTA, 2015). Despite its size, SEPTA is the last major transportation agency to change their fare medium from tokens to contactless fare cards. Although the implementation is not currently complete for the Philadelphia metropolitan area (as of May 2017), the ten-year process provides information for the decisions made that led to delays.

This thesis considers the decisions that SEPTA made during the implementation timeline by exploring the process through a public administration decision-making lens. Although a transit project of this size should expect some delays, they were prolonged due to funding difficulties, scope creep, technology obsolescence, bureaucratic inertia, technical issues, a lack of champion, unclear goals for implementation, and a risk averse nature enhanced by difficulties experienced by the Chicago Transit Authority. As the implementation enters the next phase, SEPTA should continue being transparent and explicit in announcing the delays for the system. There is a beneficial tradeoff of ensuring the tested marginal enhancement functions as expected with minimizing public disappointment and backlash.

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Chapter I
As I roamed the halls of 77 Massachusetts Avenue, headphones in, trying to figure out how to confront my busy schedule, I began to think about the reasons for matriculating at MIT. During my visits to and in reading about the institution, I learned that the purpose of the connection between buildings and infinite corridor is to foster collaboration through different disciplines. After panicking about the direction of my thesis, the belief in this collaboration and expanding the knowledge and understanding of a situation helped to reframe my thinking and calm myself down.

My college education centered around economic modeling and theory—justifying actions into rational choices based on some intrinsic cost benefit analysis done by a firm or subconsciously by an individual. My former vocation as a teacher trained and humbled me to realize that not every action can be seen as fully rational. There remains missing information that one is not privy to access. My training required me to process, synthesize, and then present information to an audience that, by the definition of the job, did not have the same knowledge as I do. As will be further explained in future chapters, the overarching theme in this thesis will focus on decisions made when knowledge is not completely available. To best illustrate this, I present the process of this thesis as analogous to what happened with SEPTA Key.

When I first heard that the Southeastern Pennsylvania Transportation Authority (SEPTA) would finally move away from their token medium, I felt lucky that this transition coincided with my own thesis timeline. As I began to dive into the process of developing research questions, contacting individuals, and having informal discussions about the Key, I became aware of the difficulties in going through the thesis process. My initial thoughts on the implementation centered on asking questions of accessibility and equity as the removal of tokens could disproportionately affect residents who do not live near rapid transit hubs. I asked
myself how these residents that are lower-income and generally people of color, would transition to a new fare medium. The transition would be going from the tangible medium of a token to a contactless card, skipping over the magnetic strip fare card (available from SEPTA, but not as ubiquitous as the token) that many other agencies experienced, leading to a possible learning curve for already vulnerable consumers. I felt I had something reasonable to research, and using my network to contact individuals in SEPTA, I soon found myself describing my idea with them.

However, a project that I thought had potential was soon diminished by the realities of the timeline of its implementation, the expectations of the adoption of the card, and the initial lack of clean data. As the school year continued, I was still interested in the process of the change, especially because of the agency’s leap from tokens to a contactless fare card described above. As I tried to restructure my thesis question, workers at SEPTA went on strike, further complicating the thesis process.

After the strike was resolved and talking through the situation with others, I continued the process of developing research questions for my thesis. During the time that passed, I noticed that the timeline presented, internally, to me by SEPTA did not correspond to what was actually happening; the implementation happened faster than anticipated. I began to reflect on this discrepancy and to wonder why this occurred. Specifically, what decisions were being made to move the implementation forward, ahead of schedule, especially when dealing with a strike? How transit enthusiasts reacting? How are SEPTA riders reacting to the rollout? Are riders in Philadelphia excited about the rollout? From this reflection, my thesis became an analysis of the decade-long implementation struggle for SEPTA Key and how SEPTA and the media reacted to the delays, difficulties, and initial limitations through the release.
What was the point in me explaining this long process of thesis? Well, it serves two purposes. First, my career has trained me to be able to present information in an accessible manner for a diverse group. Furthermore, as I began to research my thesis and argue for increased public transparency and a more positive perception on an agency that has the technical expertise to make such decision, I realized that most analyses become unreadable to the common passenger. I am attempting to break down the complicated and conflicting processes that lead to a delay on a big project. Studies have shown that increased information detailing when a vehicle will arrive changes perception (Fan, Guthrie, & Levinson, 2016). This transparency helps to calm the rider as they wait as they are aware how long they will wait instead of being a random act. Second, and more importantly, my confusion, my irrationality, and my panic could be drawn from a lack of complete knowledge of the overall situation, a theme that resonates for the reasons for the delays.

SEPTA is the regional transportation agency in the Philadelphia metro area. It runs six different modes of transport—bus, rail, trolley, trackless trolley, paratransit, and regional rail—making it more complicated than most other major transit agencies in the country. Due to this complexity, it must balance its priorities in resources to function for residents of the three states in the Delaware Valley. In the year 2016, after many delays, the agency finally released their new fare medium, SEPTA Key. This thesis will explore the reasons for the delay of the implementation, the public should respond to delays, although transit enthusiast are the early adopters who fall within the timeframe of this thesis, and ultimately, consolidate the ten-year story into suggestions, reflection, and ideas for further study. This chapter will provide the background for smart cards and the circumstances for SEPTA’s timeline.
But Why a Smart Card?

A new smart card system would allow a transit agency to change their fare structure and for the agency to use different fare collecting methods. In addition, the technology can eventually be integrated with other regional organizations to create a means for passengers to utilize the medium for easier payments.

Preparation for changing technology requires the accomplishment of incremental steps in order to prepare the public. In other markets that experienced a transition, there was either a magnetic strip card that allowed for some knowledge of how to use the new technology or they deployed limited-use paper store value cards that could be purchased and used for a single ride. Issues at this stage of the process include accessibility, the cost of installing machines to vend the product, and the placement of customer service agents to ensure that the customers have no difficulties during the transition.

When releasing a new fare medium, another consideration for an agency is the adoption rate. SEPTA Key is currently free when coming out of a vending machine. Afterwards, users have the option to register their cards online to manage the travel wallet, following the example set forth by their peer organizations. Eventually, the system should fully transition to the Key, eliminating the token and the current magnetic strip cards. However, the elimination of the token comes with several complications, such as the handling of fares for social services. Tokens are an accessible way to pay a fare and an easier way for social services to provide a means for the people in the Philadelphia area to use public transit to reach their necessary appointments.

A smart card is used on an electronic reader when boarding or passing through a turnstile. The reader authenticates a chip on the card, which contains encrypted data through
the means of a serial number or identification key. This step is meant to avoid any fraud through stolen or counterfeited cards. Next, the reader accesses the user’s monetary balance, the pass usage, or a transfer. In some systems, the results will be displayed on the reader, although this does not occur on SEPTA. Depending on the system, the information is then transferred to a server in order to validate the data, or it is processed by the reader, but with a lag in synchronizing the data to a central repository. The card then has new data written on it to indicate the remaining balance, remaining trips, or used transfer. Drivers will have information that indicates whether there is a valid payment and, depending on the system, whether or not there were any issues.

Common errors that can occur with the card include an invalid card, sometimes because it has not been registered or it is the first time used. Adding value, sometimes possible at a fare box, could not complete the necessary function resulting in an error. The card could have been close enough to the reader to be counted as a touch, a variety of a general read area. For those who have many RIFD cards in a wallet, multiple cards might be touched leading to errors with the reader.

Registering the card with private information can allow the agency to track specific users, gain data, and create algorithms to predict destinations. This information could then potentially be sold to outside parties, employers who provide incentives to use the cards for traffic demand management, and law enforcement agencies in the guise of crime solving. This then add to an already strained ideal of what public transportation is.

Issues with Public Perception

One of the main issues with public transit is a negative public perception. If this is the case, how can a transit agency improve with such negative attitudes? What does the public
desire from its transit agency? Where does the disconnect between the agency and the public occur in this exchange of information? While this thesis will not attempt to solve perception problems that plague public transit, it will try to explore the disconnect between what the public perceives in the responsibilities of public transit and how transit agencies respond to face these criticisms and improve their service through the release of the new fare medium. With this move, it joined its transit peers and became the last major agency in North America to abandon the token.

Changing city designs and demographics lead to a push for public transit. The younger generation are driving less (Dutzik, Inglis, & Baxandall, 2014). Immigrants and people of color generally rely on public transit (Blumenberg & Shiki, 2007). With an increasing base, the public transit system becomes a driving force in the city, sometimes featured in their tourism brochure, such as the marketing for New York and London. This leaves transit agencies in a unique position—as a utility with little competition, an innovator that must advance their own cause for their region, and a follower looking to see how other transit agencies adapt to changing technologies and peoples. The riders grow pride and frustration in the operation of their city's transit and, with increasing knowledge of how other systems operate, demand that their agency follow with the newest technology and, above all else, ensure easy and smooth transitions. This thesis explores how SEPTA dealt with this frustration as it experienced delays in the implementation of their smart card, as well as the negative reception due to this delay.
Oh. But isn't this the 22?
Yeah, Monday, Wednesday, Friday. Tuesday, Thursday, it's the 22-A.

Figure 1. Still and dialogue from The Simpsons.

Although a transit agency would like to work at 100% efficiency, real-life situations and random events make this difficult. Issues such as bus bunching, which is defined as more than two buses approaching a stop within half a headway, are normal occurrences in transit due to normal variations in ridership. While transit agencies try to fix this issue, the public has a hard time perceiving why this occurs. Consider riders who do not understand that when a train passes them, it is to keep the system running on schedule. All passengers feel is the frustration from a system that is not accomplishing its goal of providing reliable transportation leading to a lower perception of the agency. The transit agency struggles with transparency and educating the public on uncommon operation methods. This could be seen in Figure 1, where Lisa Simpson believes she got on the right bus to find out that there was confusion due to the inaccessibility of data. Information helps calm the passenger and improves perception—various reports state that when riders know how long they will wait at a stop, they are less stressed
and have a better view of their current ride (Fan, Guthrie, & Levinson, 2016). SEPTA will be able to use gathered information to improve their services.

**What the Future Brings**

Once the implementation is complete, there are opportunities for SEPTA to fundamentally change their organization. Following the examples put forth by other organizations, SEPTA can help with traffic demand management, restructure their bus system, and finally solve their transfer problem.

The radio-frequency identification (RFID) technology will allow for various cards to be coded into the system which will allow employers, developers, and universities to add SEPTA Key features into their badges or IDs in order to partake in traffic demand management. Institutions can negotiate with SEPTA to get a reduced fare and then bundle this discount into an annual fee. For example, at the University of Pennsylvania, students can order a PennPass, a card that provides a small discount for the semester (University of Pennsylvania, 2010). The benefits of this is that it incentivizes individuals to travel using SEPTA, freeing up the need for parking spaces and allowing organizations to use that space for other reasons (Garling & Schuitema, 2007). This leads to increased walkability and decreases the release of pollution improving the quality of life for an area (Garling & Schuitema, 2007). Zoning changes and an eventual decrease in the dependence on car should follow (Garling & Schuitema, 2007).

SEPTA should look into how to use Key readers to enhance their partnerships with universities because it would get a guaranteed revenue stream and will increase ridership. This new money could be used to improve services, pay back debt, or provide capital for expansion. According to CityLab, there are “slightly more than 450,000” college students in Philadelphia in 2012 (Florida, 2012). SEPTA can help these students get around the Philadelphia metropolitan
area and become less reliant on funding variability from government if they can increase their ridership levels. It is a process that has begun to take place through a Youth Advisory Council run by SEPTA.\(^1\)

As ridership and adoption of SEPTA Key increases, more data is provided to the authority. What excites me most about SEPTA Key is the ability to have geolocated data collected into a central server. This data would allow for more accurate numbers of the ridership of bus lines, the headways that people experience, and most importantly, a means to figure out transfer points through OD Matrix analysis. This process will help increase the frequency of buses throughout the city of Philadelphia and help change the bus system.

In transportation planning, there is a tradeoff between frequency, how fast a vehicle will arrive, and span, how far a service reaches, due to constraints on manpower and equipment. Philadelphia has an impressive span of buses that reaches every part of the city, but this leads to low frequency for riders on bus routes. Frequency matters more for riders and dependent riders who have inelastic demand for transit will travel a bit further to reach a bus that arrives quicker (Walker, 2012). The best bus networks are those that serve a grid with buses that travel in straight routes and that have easy connectivity with other routes that allow for transfers (Walker, 2012). This increases frequency as buses no longer have to travel as far to span more of the area.

The data that SEPTA Key will bring will help determine more accurately which bus routes truly have the highest ridership and to figure out travel patterns for Philadelphians compared to what is currently available. This data would lead to something that has eluded SEPTA, accurate transfer pricing. Free transfers could help restructure bus routes that travel

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\(^1\) More information found at [http://septayac.com/studentfare/](http://septayac.com/studentfare/)
from the edges of the city, not served by rapid transit, to Center City for those riders who avoid the transfer charge. It is an inefficient system that SEPTA runs due to unused capacity for

Figure 2 Bus routes with high ridership

the Broad Street Line (BSL), the north-south trunk of the SEPTA Subway system, which riders could be encouraged to use. This is seen in Figure 2 as the buses with the highest ridership runs parallel to the BSL in a map created by the City of Philadelphia Mayor's Office of Transportation and Utilities (now the Office of Transportation and Infrastructure Systems).

Thomson Khao created a frequency map using SEPTA data run through SQL in order to map the most frequent service routes. In Figure 3, he looked at headways, the amount of time between buses, instead of frequency, the number of buses within a timeframe, but they are typically inverses of each other. What can be seen below is that although there is a great span for SEPTA, many riders have to wait a prolonged period for their bus to arrive. Figure 3 shows that crosstown bus service is infrequent. Free transfers can shift riders towards these routes to alleviate some of the capacity issues currently faced by the Market Frankford Line.
As seen in the maps, there are inefficiencies in the service provided by SEPTA with an opportunity to shift modes to better cover capacity. Geolocated data will help SEPTA fully determine their main bus routes and help SEPTA establish free transfers. Transfers have been a tricky part for SEPTA, as they have one of the highest transfer costs in the country at $1.00. Although the fare with a token is $1.80, which makes it cheaper than its peer agencies, the additional cost of transfers puts SEPTA in line with other transit agencies who charge little or nothing for transfers as long as it is completed within a time frame of usually two hours. This high cost has hurt ridership for SEPTA, as a 2012 study by the Delaware Valley Regional
Planning Commission stated that ridership could increase by 11% if paid transfers were eliminated by SEPTA.

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But Everybody is Late...

Table 1 Major Transit Agencies and Smart Fare Card Release Dates

<table>
<thead>
<tr>
<th>Agency (City)</th>
<th>Smart Card</th>
<th>Release Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>MARTA (Atlanta)</td>
<td>Breeze Card</td>
<td>2005</td>
</tr>
<tr>
<td>MTA (Baltimore)</td>
<td>CharmCard</td>
<td>2011</td>
</tr>
<tr>
<td>MBTA (Boston)</td>
<td>Charlie Card</td>
<td>2006</td>
</tr>
<tr>
<td>CTA (Chicago)</td>
<td>Ventra</td>
<td>2013</td>
</tr>
<tr>
<td>METRO (Houston)</td>
<td>Q Card</td>
<td>2008</td>
</tr>
<tr>
<td>LACMTA (Los Angeles)</td>
<td>TAP Card</td>
<td>2008</td>
</tr>
<tr>
<td>MDT (Miami)</td>
<td>EASY Card</td>
<td>2009</td>
</tr>
<tr>
<td>Metro Transit (Minneapolis-St. Paul)</td>
<td>Go-To Card</td>
<td>2007</td>
</tr>
<tr>
<td>------------------------------------</td>
<td>------------</td>
<td>------</td>
</tr>
<tr>
<td>PATH (New York/New Jersey)</td>
<td>SmartLink</td>
<td>2007</td>
</tr>
<tr>
<td>PATCO (Philadelphia/New Jersey)</td>
<td>FREEDOM Card</td>
<td>2008</td>
</tr>
<tr>
<td>SEPTA (Philadelphia)</td>
<td>Key</td>
<td>2017</td>
</tr>
<tr>
<td>UTA (Salt Lake City)</td>
<td>EFC Card</td>
<td>2015</td>
</tr>
<tr>
<td>MTDB (San Diego)</td>
<td>Compass Card</td>
<td>2009</td>
</tr>
<tr>
<td>MTC (San Francisco)</td>
<td>Clipper Card</td>
<td>2008</td>
</tr>
<tr>
<td>King County Metro (Seattle)</td>
<td>ORCA Card</td>
<td>2009</td>
</tr>
<tr>
<td>WMATA (Washington, DC)</td>
<td>SmarTrip</td>
<td>1999</td>
</tr>
</tbody>
</table>

In an interview with PlanPhilly, O'Brien, stated that, “Cleveland, five years late; Pittsburgh, three years late; Boston, two years late; [Chicago], who was super fast, was one year late. NYC MTA—the RFP, just the RFP alone, is 2 years late. And they’re projecting to 2023.” If this is normal, why does Philadelphia feel like their implementation strategy seems worse? Is it because of the transition from the token to the smart card? Does it have to do with the nature and perception of Philadelphia? Is this an underdog story? The following chapters try to see why this situation might be uniquely Philadelphian.
Chapter 2
Background Literature

I decided to examine the delay of SEPTA Key through the framework of decision theory. While there are factors external to the decision makers that might influence delays, I believed, either through pre-perceived perceptions of Philadelphia or just disbelief in the ability of a bureaucratic institution to deliver something competent, that many of the decisions made by the organization exacerbated the delay. Relying on my economics background, I decided to look at variations of traditional cost-benefit analysis to explore how knowledge influences decisions.

While I initially began my literature review by looking at traditional business models for traditional organizations, I realized that the structure of public administration is different. These decisions have to be made not necessarily thinking of profit as a motivator, but rather the ability to serve the public in their best interest. For a public transit agency, this could be considered as helping the most people, serving the biggest area, creating the most accessible system, or increasing ridership. Like other organizations, there are tradeoffs to consider when making these decisions. For transit organizations like SEPTA, there is a responsibility to many stakeholders: riders, advocacy groups, legislatures, executives, and their own employees, among others.

Bureaucratic Model

Max Weber's (1947) *The Theory of Social and Economic Organization* is the basis for the bureaucratic model, a method used specifically to analyze public agencies. According to this model, public agencies are designed in a structure that contributes to their decision-making process. As the public generalizes and believes there are too many layers to certain organizations, public agencies have a defined chain of command in which subordinates report
to their superiors, and subchains are kept small in order to create more a cohesive unity (Swedberg & Agevall, 2005).

Departments are separated by tasks and are headed by a superior in order to divide the workflow to differentiate and specialize employees and groups (Swedberg & Agevall, 2005). Different employees then fall into the chain of command, responding to their superiors, and are specialized into tasks to complete the overall goal of the agency.

In order to maintain this division while supporting the overall unity of the organization, there should be a guiding system to separate all individuals involved in the organization in order to reinforce detachment of work and workers (Swedberg & Agevall, 2005). To continue this division, interpersonal relationships should remain professional and impersonal so overall decisions can be made without bias (Swedberg & Agevall, 2005). There are support staff to help supervisors maintain the hierarchy and system (Swedberg & Agevall, 2005); in transit agencies, these positions would include auditors, accountants, and procurement experts. The purpose of these positions is to advise, though they are not necessarily in the chain of command.

While this structure creates economic efficiencies due to the specialization of employees and the rules that govern, it is dependent on competent and capable supervisors (Weber, 1947). In transit agencies, this means that the supervisors have the training to understand the nuances of planning, scheduling, and optimizing routes, fare structure, and ridership decisions. However, in the instance of fare cards, it is a new technology whose errors have not been fully thought through, leading to difficulties in the implementation. For this reason, major transit agencies rely on consulting firms and specialized companies to manage new fare integration.

A reliance on outside firms in transportation highlights inadequacies with the bureaucratic model. While the rigid structure provides the necessary hierarchy, control, and specialization for the organization, it does not include outside political and social
externalities that might influence a decision. For transit agencies, especially those in major metropolitan areas, this means that rural areas of the state can influence funding of the agency, and the perception of the riders could sway transit plans. It seems that Weber (1947) understood the limitations of the self-contained model, by putting forth the idea that behavior is actually a network of interactions influenced by causes and effects.

**Systems Theory**

To present a more inclusive view of organizational theory, Ludwig von Bertalanffy (1934) began to develop systems theory, which was not fully developed until Kast and Rosenzwig (1972). Rather than having each organization isolated as individual self-sustaining agency, Kast and Rosenzwig (1972) suggested that there are relations between different stakeholders and organizations, with actions that influence each other, which lead to a methodology based on the traditional scientific method and shared jargon to define principles and to measure organizational decisions.

Identifying principles of scientific explanation common to all types of systems would make it possible to use knowledge from more rigorously understood systems to explore a less understood system. Since there are inputs, process, outputs, feedback loops, and different environments to be considered, this falls under a systems model; any change among these inputs will affect other inputs, no matter the complexity or lack of knowledge due to the dynamic interconnections (Kast & Rosenzwig, 1972). Using this model, decisions are affected by unexpected externalities, such as outside players or a lack of knowledge. The system interactions would depend on the State of Pennsylvania, Philadelphia’s government, riders, advocacy groups, and their peer transit agencies.

When working at the most effective level, there is seamless communication and knowledge between different players in this model. The ideal situation requires intimate
knowledge of the players, expectations, process, interactions, supervisors, and direction to best make decisions (Kast & Rosenzwig, 1972). This can provide an advantage for discretion in the initiation of a process, for representation, and for political advantages such as promoting change (Kast & Rosenzwig, 1972). The maximum utility to the systems model relies on the frictionless exchange of information.

The real world does not work that way. There are individuals and organizations that do not and cannot share all their information, leading to generalized views that could limit insight for decision making (Kast & Rosenzwig, 1972). However, by recognizing that outside forces have influence on an organization's actions and reality, organizations can move forward to alter their futures (Senge, 1990). This is a key aspect for innovation in public transit agencies.

Rational Decision Theory

To better understand the decision-making process made by SEPTA, it is important to be aware of different models that range from traditional economic analysis to methods to compensate for limited knowledge. Rational decision making contains various elements to aid in the process, based on classical economic theory of the rational consumer. Decision makers have a unique problem that can be removed from a pool of problems to provide a means for comparison (Simon, 1979). Once this separation occurs, a ranking occurs for various attributes to the problems—goals, values, priority, and the process (Simon, 1979). With this ranking, alternatives can be considered to solve the problem (Simon, 1979). Here is where traditional cost benefit analysis comes to play, as the decision makers attempt to determine the net value from each possible alternative before comparing the net value with each alternative (Simon, 1979). The ultimate goal is make a decision based on which
alternative provides the maximum utility—measured through goals, values (monetary or a different metric), and objectives (Simon, 1979).

Public agencies tend to overly rely on this method as this creates some value to present to policy makers and supervisors to guide decisions. While this is useful in regard to seeing some tangible value to guide maximizing net benefits, there remain issues. A major one is that all problems do not have clearly defined parameters and benefits; there remains some lost information during this process (Simon, 1979). Decisions are optimally made with enough information for possible alternatives and actions, which requires interaction, access, and possibly most importantly, time to gather the information. When transit agencies have deadlines to meet, this creates gaps in knowledge leading to less than optimal decisions. As the agency moves forward, sunk costs accrue due to commitments and investments that have occurred through the decision process.

**Incrementalism**

To solve the issue of lost knowledge, an incremental approach can be applied to decisions. By becoming more descriptive during the decision-making process, incrementalism asks for goals, objects, and empirical analysis to be provided along with the steps necessary to accomplish a goal (Lindblom, 1959). With this much knowledge, the decision maker starts thinking on the margin, through increments, of how each alternative will affect policy change (Lindblom, 1959). Consequences are still evaluated through this process. The difference is that this form of thinking allows for the problem to be continually redefined (Lindblom, 1959). This process also allows for adjustments to make the problem appear more manageable due to the limited consequences for continuations and thus making this process appropriate for current issues versus future goals (Lindblom & Cohen, 1979). This becomes useful for users who are pragmatic and looking for a realistic solution due to the lack of
time, knowledge, and resources to complete a thorough cost benefit analysis. This process would be able to create stop gap solutions for current issues by minimizing costs, accomplishing a baseline measure of satisfaction, and are constrained by outside forces.

Mixed Scanning

To create a response for the criticism of incrementalism and rational theory, Amatai Etzioni (1968) developed mixed scanning combining both models. His argument is that incrementalism relies on the interest of the most powerful and organized within an organization, thus ignoring what other individuals might desire. Focusing on short-term solutions also limits the overall organizational needs, inadvertently hurting the organization (Etzioni, 1968). To solve this issue, mixed scanning, as its name implies, combines rational and incremental decision models. To begin the process, rationality will establish long run goals and directions (Etzioni, 1968). Once these are set, incrementalism will guide the decisions to make effective and necessary decisions at crucial points in a timeline (Etzioni, 1968). The balance of this approach allows for decision makers to react to the situation at hand, the amount of knowledge possessed, and the cost factor to push forward a decision (Etzioni, 1986). This allows for a pivot when a major problem arises for the organization to allow for a new analysis to solve the issues (Etzioni, 1968). As the project develops, mixed scanning allows for workers to not get overwhelmed due to limited capacity in the organization while also allowing for a full acknowledgement of consequences that could be missed by only incremental decision-making (Etzioni, 1968).

Summary

SEPTA, like many transit systems, is a public agency that has to balance its many departments with varying goals, even if they are at conflicting odds. Although, SEPTA would like
to always be making rational decisions to maximize utility, the reality of day to day operations makes this difficult. Furthermore, what aspects should be maximized is difficult to figure out determine in public transit—area covered or frequency, the mode that gets the most funding, expansion or ensuring the system runs efficiently. With all these factors, the amount of information is massive and the communication of that information gets muddled, making it difficult to make complete rational decisions. As I will discuss in future chapters, outside factors further cloud this decision leading to a heavy reliance on incremental decisions.

With its long-term goal of implementing the new fare medium, SEPTA relied heavily on incremental short-term solutions to move the project along. However, it enters this process as the last major transit agency to transfer to contactless fare media. This seemingly disadvantageous position provides SEPTA with more information than its peers leading them to make their incremental decisions with more information and thus, hopefully, decisions that help move the process along with fewer difficulties.

**Methodology**

To analyze the delays that plagued SEPTA, I will take this background research on decision theory methodologies to explore the decision-making processes to see how that may have impacted delays. With a project that is scheduled to take three years, the initial thought is that a thorough cost benefit analysis occurs to begin the process. Though this may be true, delays require incrementalist approaches to provide quicker results in a project that could receive public backlash. I contend that this approach is limited, and by not considering all possible factors, the delays were exacerbated.
Through the knowledge that other agencies faced delays, SEPTA became aware of their incoming delays. The most prudent decisions were to inform the public of the delays, weathering the backlash to ensure that each incremental addition to the implementation functions well. This was done to avoid the public relations disaster that Chicago faced, adding to a risk averse culture at SEPTA, a cost to be considered in their implementation.

Key (Get it?) Questions

Using these theories, I hope to answer the following questions dealing with the implementation:

1. How did the agency make their decisions?
   a. How did SEPTA identify alternatives, outcomes, probabilities, and utilities? Does it have a set process for this? Did a hierarchal structure affect these decisions? Did they go through a process of hypothesizing, testing, and refining a sequence of tentative formulations?

2. What is the decision?
   a. In general, a decision is a choice made by some entity of an action from some set of alternative actions. In this case, what are the decisions, broken down by overall delay issue, that have been made in regards to a new fare medium?

3. How should the decision be evaluated?
   a. Is public perception more important? Should the decisions be evaluated internally by employees who are experts in their field (one hopes)? Does this accomplish a political goal? Are costs minimized? Are benefits maximized?

4. What made this decision the appropriate decision?
   a. Does the decision improve the perception and relationship of the transit agency with the public? Has the group who made the decision identified alternatives that would be
just as good or did they focus on another aspect of delivery, such as timeliness or cost?

Who is making the decisions?

Using newspapers, press releases, news videos, and quotes from interviews, I formulated the following analysis. After exploring the data, I determined that there are seven categories that caused the delays as they were the issues that came up the most: lack of funding, scope creep, technological obsolescence, bureaucratic inertia, technical issues, lack of champion, unclear goals, and a risk averse culture. In exploring the questions outlined in the previous chapter, this chapter will examine each of the eight aforementioned categories through a deeper understanding of the reasons for delay, SEPTA’s initial reluctance to move forward with the implementation, and public interaction with each of these issues. It will consider, through understanding where the lack of information lies, the process SEPTA underwent. For each category, I will discuss how public agencies view these issues, how they apply directly to SEPTA, and finally analysis and possible directions. A table at the end of each section summarizes the key decision-making questions.
Chapter 3
When asked about the nature of delays that are in the public eye, sensitive responses are required. Although I reached out to individuals involved with SEPTA and the CTA asking about the implementation of their fare cards, I was told that they would not like to be on the record with such information. Following the parallel that my thesis took to the implementation of SEPTA Key, I found myself at an incrementalist point—I needed a method to analyze the implementation without having the full access to the information. However, I thought with the public nature of this implementation, journalists would document the process and inquire to the delays.
SEPTA Key Timeline

2007: Announcement for Request For Proposals (RFP) goes out; SEPTA believes implementation will take 3 years.

2008: Initial RFP bids accepted.

2009: Initial deadline passes without contract awarded.

2010: SEPTA faces $120 million budget hole; does not get bailed out by state proposal to toll Interstate 80.

2011: SEPTA receives $175 million loan from PIDC; SEPTA awards contract to ACS and states new fare card system will be complete by 2013.

2012: SEPTA adds test lab for upcoming fare card. SEPTA believes it can still launch in 2013 for subway and 2014 for Regional Rail.

2013: Pilot testing begins in October. SEPTA states that by Summer 2014, tokens will be gone and the new fare system will be ready.

2014: SEPTA claims that the SEPTA Key (official name) will be ready by Feb. 2015; Begin being explicit in their delays in exchange for a good rollout.

2015: SEPTA Key is slowly rolled out—first to senior citizens; push back full release from end of 2015 to early 2016 to April 2016.

2016: SEPTA Key delayed until June; Initial rollout happens in June with weekly and monthly pass; SEPTA continues to test and add features slowly.

2017: SEPTA finally allows for the Travel Wallet bought in the system; SEPTA still needs to implement for Regional Rail.

Figure 4 SEPTA Key Timeline. Compiled from the Philadelphia Inquirer, PlanPhilly, and SEPTA press releases.
Lack of Funding

In Public Agencies

Without capital to move forward, a project is stuck in limbo. Without excess funds, public agencies are left without excess capacity to innovate and move the company forward. An agency could have bureaucrats who then do not push for such innovation and remain with the status quo without sufficient funds to move forward. These innovations are untested and thus have risks, leading lenders to be reluctant in providing financial support (Kim, Echeverry, & Guruprasad, 1994). Furthermore, transit agencies do not have much control over their funding sources since most of it comes from government subsidies. A portion comes from fares, and this could be increased by increasing ridership, but these gains are drops in the bucket compared to government funding. With this reliance on government, there is always the fear that funding could be lowered due to political fights and the advancement of competing programs, an issue that bleeds into bureaucratic inertia (Kim, Echeverry, & Guruprasad, 1994).

For SEPTA

As with most public works projects, funding becomes an issue due to the uncertainties related to paying for all the difficulties that may arise for the project to move ahead. In 2007, when SEPTA put its first Request for Proposals (RFP), the beginning of the procurement process for public agencies that establishes bids and contracts, it expected a response that would result in a three-year timeline at a cost of around $100 million (Philadelphia Inquirer, 2007). This initial cost was replaced by the final estimate of $142 million, which should have gone through a rigorous cost benefit analysis with as much information presented by bidding
companies. The goals at that point should have been clearly outlined, but there were funding issues throughout the process.

The original awarding of the bid was delayed until 2011, when SEPTA disclosed a $120 million budget hole (Campisi, 2010). The agency was relying on a Pennsylvania proposal to toll Interstate 80 to provide relief for the budget and allow projects to continue (Campisi, 2010). This is a common problem for major transit agencies throughout the United States, as funding is tied to state plans and rely on political compromises by municipalities to push forward on plans.

Such budget impasses then get passed onto riders as fares go up to, hopefully, generate more revenue. This creates a terrible cycle for riders as they see a higher fare that leads to poorer service leaving the transit agency with a worse perception. In this instance, SEPTA planned to raise fares for the first time since 2007 by 6 percent. At the time, this resulted in a base fare of $2 for buses, trolleys, and subways. Tokens would rise 10 cents to $1.55 (Campisi, 2010). A reason why transit agencies feel comfortable raising prices, is that fares are a highly inelastic good—people who ride public transit are generally very reliant on it so they have little choice but to pay the fare increase. According to an interview SEPTA spokeswoman Jerri Williams with PlanPhilly, ridership would see an overall decrease of about 1 percent in ridership (Campisi, 2010).

As a transit agency whose goal is to provide rides for the residents of the city, SEPTA looks for funding through any method. In 2011, SEPTA received a loan of $175 million at an interest rate of 1.75% to fund the implementation of a new payment technology (NPT) specifically from the Philadelphia Industrial Development Corporation (PIDC) (Campisi, 2011). Although the expected cost was $100 million, the extra money was meant to cover unexpected
costs arising from the implementation, such as modernizing existing infrastructure (Campisi, 2011). With added resources, SEPTA could now create a better analysis to drive its decision.

Although the information is now available to the public from them to now see the necessary funding to accomplish the task at hands, a deeper dive into the root of the money could affect public perception and create externalities later in the implementation. PIDC receives a portion of their funding from the Immigrant Investor Programs’ Welcome Fund, the EB-5 visa, which allows foreign investors to provide money for economic development and produce a number of permanent jobs in exchange for permanent residency in the United States (USCIS, 2017). For the PDIC loan, this means that Philadelphia has invited 350 investors to create 3,500 jobs for the NPT (Campisi, 2011). The benefit for SEPTA is that PDIC accepts the risk of job creations rather than added pressure on SEPTA to deliver jobs. Investors considered SEPTA a cromulent investment. While the money is needed and the public would accept the funds, I do not believe that the general public is familiar with the EB-5 program due to the lack of news coverage and its use in high end real estate development. With a polarized electorate, accusations of supposedly selling green cards could potentially create future political issues for SEPTA.

Nevertheless, the loan came in three tranches. The first tranche provided $35 million by the end of 2011, the second gave SEPTA $75 million in September 2012, and the final tranche of $65 million was received on July 1, 2013. The goal is to pay back the loan by December 2019 (Campisi, 2011).

SEPTA CFO Rich Burnfield stated that $20 million, two years’ of debt services, has been set aside by the organization and that SEPTA would redirect money from other projects to pay outlying years if additional funding is needed (Campisi, 2011). The general manager at the time,
Joe Casey, stated that the project was too essential to fail and sometimes “you play the cards you’re dealt with” (Campisi, 2011), an incrementalist approach for possible obstacles.

Then Mayor Michael Nutter approved the loan and echoed SEPTA’s sentiment of the importance of the new technology by stating that it “will serve Philadelphia residents and fundamentally transform regional transit access” (SEPTA, 2011).

As the implementation process continued, SEPTA could blame delays on funding constraints as the organization had budget limitations in 2013 that could have created a doomsday scenario of losing bus and Regional Rail routes (Fisher, 2013). It was Act 89 that helped Philadelphia gain the capital needed to move forward. Act 89, passed in November 2013, invested $2.3 to $2.4 billion in transportation by eliminating a flat 12-cent gas tax and modernizing the financing structure through the uncapping of the wholesale, Oil Company Franchise Tax (Pennsylvania Department of Transportation, 2017). The act also increased the resource pool for multimodal funds in non-highway transportation needs (Pennsylvania Department of Transportation, 2017).

Analysis

Although funding constraints are common through various transit agencies, I believe that the lack of funding is not the main reason for the delay in the implementation of SEPTA Key. As it moved through the process, the incrementalist decisions to combat delays hindered expedition of the rollout. Furthermore, the explicit reveal of funding shortfalls and views of priorities from the organization created a disconnect of what riders see as a priority—the ability to reach their destination in an efficient manner or the ability to use new technology.

In other public agencies and other transit agencies, there are innovations for funding that could help SEPTA. Financing districts use exactions to gain the economic gains from developers or neighborhood activities that come as a result of transit innovations. There could
be a transition to privatization, from public-private partnerships to full privatization to fund public transit. However, this would make public transit agencies pure profit driven organizations, sacrificing the number of riders served for pure economic efficiencies. The subsidies are required, especially in major metro areas, to serve those dependent on the service. It is important to maintain some balance of innovation, general revenue, subsidies, taxes, and fundraising alternatives without over-relying on user fees in order to encourage development, users’ ability to pay, and innovation (Kim, Echeverry, & Guruprasad, 1994).

Table 2 Lack of Funding Decision Table

<table>
<thead>
<tr>
<th>Decision-Making Questions</th>
<th>SEPTA Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>How did the agency make their decisions?</td>
<td>SEPTA could not move forward with the Key without the appropriate funding. SEPTA’s decision appears to find funding specifically for the new payment technology and was willing to divert funds from other projects to accomplish this task.</td>
</tr>
<tr>
<td>What is the decision?</td>
<td>SEPTA had to wait and was delayed 4 years since the original RFP went out until it could move forward. Their decision has been to wait for the appropriate funding instead of diverting money from other programs.</td>
</tr>
<tr>
<td>How should the decision be evaluated?</td>
<td>SEPTA’s responsibilities are to its riders, not to new technology. It could continue to function with tokens and their funding, so it was not necessary for them to move look for funding specifically for the new payment technology, when it could use the money for the whole system.</td>
</tr>
<tr>
<td>What made this decision the appropriate decision?</td>
<td>It was appropriate to delay the NPT until it could fully go forward, a concept that SEPTA did not realize it would strictly adhere to until later in the implementation.</td>
</tr>
</tbody>
</table>
Scope Creep
In Public Agencies

Scope creep can be defined as the change to a project after it has already started. Examples that lead to scope creep include initial issues with contract language in the original projects documents, a lack of foresight and planning, ill-defined final goals and expectations, and poor management. In public works projects, such as SEPTA Key, it is almost impossible to avoid scope creep due to the length of time required, changing public desires, changing administrations, and turnover within the workforce.

For SEPTA

The best action that SEPTA could have taken (and still take, as the implementation is ongoing) is to focus on what they consider to be the highest priority through their internal values, whether this is continuing the rollout or reducing technical errors, and this is the decision SEPTA made. This leads to the public perception that SEPTA was unaware of what they wanted when they asked for proposals in 2008. The agency knew it wanted a comprehensive fare system for all its modes and a proposal that allowed for flexibility adapt to new technologies, but was unsure of what this would look like when completely implemented.

The initial delay of the RFP is a reason for the scope creep that plagued SEPTA Key. Because SEPTA became one of the last major transit agency to adopt a contactless fare card, that lag added to its issue. While it could learn from the mistakes and timelines from other agencies, it also saw the potential of the next steps. The three-year delay from 2008 to 2011 allowed SEPTA to change the initial contract requirements.

According to an interview with PlanPhilly, SEPTA Key Project Manager Kevin O'Brien stated that initial changes were made to respond to the design of the project due to the
uncertainty of the technology (Campisi, SEPTA awards $129.5 million contract to build new fare system, 2011). Once the bidders proposed technology, the RFP had to change to accommodate the incoming proposals. During the RFP process, SEPTA needed to continue to secure funding, while balancing the expectations that changes would bring. The winning bid came from Affiliated Computer Services, since acquired by Xerox (SEPTA, 2011). Once ACS signed on with SEPTA, the bid documents added 26 addenda, expanding the initial scope (Campisi, 2011).

Even during the bidding process, SEPTA seemed confident that it would take two years to implement the new fare medium. Once the contract with ACS was signed, it separated some deliverables into different time frames, but still predicted the implementation would be around three years (Campisi, 2011). The scale of the project seemed to be lost on SEPTA resulting in an inaccurate timeline. The original specification in the bid was already 888 pages long and the coming changes would expand expectations (Saksa, 2015).

In order for this timeline to be accomplished, SEPTA would have to focus its resources on the implementation, accepting that it would have cost overruns but maintain the public goodwill that the project meet some deadline. The process that SEPTA picked was to allow for the delays, but be diligent and explicit in communications with Philadelphians about the delays. Although the initial frustration exists, the hope is for a product that works with little issues so that the public can soon forget about any past issues.

Analysis

For future projects, and to continue the implementation, there are steps SEPTA can take to limit the effects of scope creep. This issue will be further explained in another section in this chapter, but all the stakeholders were not involved in the initial planning stages as there
were no software engineers to help facilitate the transition and to explain the process of the required code.

Benchmarks used in project management could become more explicit in the requirements for achieving a timeline. However, there are issues with this, as transit agencies need to be able to adapt and accept changes to provide the required public services. First, documentation on the entire scope should be created. While this is written in the contract, it then became necessary for all stakeholders to agree to not move beyond the constraints. SEPTA could have been more explicit in the penalties that ACS would have to pay for late implementation. However, this became difficult due to initial issues with the contract that works off economic incentives.

Perhaps the simplest and most public facing solution to scope creep for Philadelphia is to fulfill the initial implementation of SEPTA Key and add various functionalities later. A beta is meant to find bugs that are lost to developers, but such a prolonged period can frustrate users for a technology that is meant to make the transit process easier. From an intimate knowledge of the possible issues and the influence that Chicago had on the process, it makes internal sense for the delays. What SEPTA did right is accepting the difficulties and telling their riders to be patient, even if their users felt this testing period was too long. Eventually, the negative publicity will wear off if the product delivers with almost 100% performance, as has been seen in Chicago.

As SEPTA Key started to become a reality, the ambition of the Key slowed down the implementation. The desire to implement the medium in Regional Rail created added delay. Although material evidence of SEPTA Key were seen throughout the city of Philadelphia, the implementation seemed stalled to the daily rider. Rather than being able to drop their token in
to pass through the turnstile, riders faced new fare boxes without a medium available to use those fare boxes.

Perhaps the best benefit for SEPTA is that through the delay, no matter the true root cause, it allowed them to avoid pitfalls that other organizations had, accept newer technology such as a backend server to hold value, and be in a position to create fundamental change to the industry such as payment on the Regional Rail, SEPTA's commuter line, a task that has yet to be implemented anywhere in the world. A strong product will weather the publicity difficulties and being first will embiggen city pride.

Table 3 Scope Creep Decision Table

<table>
<thead>
<tr>
<th>Decision-Making Questions</th>
<th>SEPTA Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>How did the agency make their decisions?</td>
<td>SEPTA was affected by scope creep due to initial delays, and it had to play catch up. As SEPTA realizes their initial goals, they figure out the next steps that they had to accomplish to cover the greater scope in order to establish a smooth implementation, an incrementalist approach.</td>
</tr>
<tr>
<td>What is the decision?</td>
<td>Each addition led to a delay but most of these issues were to ensure that there is a smooth implementation.</td>
</tr>
<tr>
<td>How should the decision be evaluated?</td>
<td>The technical issues, although leading to delays, were the best delays that could have happened to SEPTA. Realizing the bugs allowed them to slow each step down to the point where bugs were eliminated.</td>
</tr>
<tr>
<td>What made this decision the appropriate decision?</td>
<td>This depends on the ultimate goal: if SEPTA wanted a quick rollout with bugs, then it was wrong to add to the delays. However, I believe that SEPTA wanted public relation issues it could handle and, thus, appreciated the pace to provide a dependable product.</td>
</tr>
</tbody>
</table>

2 To illustrate how negative perception affects the initial release of a product, an episode of the HBO show Silicon Valley describes technologies that faltered due to negative views: "How bad is this, be honest? Is this Windows Vista bad? It's not iPhone 4 bad, is it? F*ck. Don't tell me this is Zune bad." "I'm sorry Gavin. It's Apple Maps bad."
Technological Obsolescence

In Public Agencies

Technological obsolescence occurs when technology is no longer desired even though it still works fine, such as a basic cell phone in the time of smart phones. Technological obsolescence is part of functional obsolescence which results from “a flaw in the structures, materials, or design that diminishes the function, utility, and value of an asset” (Barreca, 2000). A flaw would not allow the technology to perform their desired function, which is dependent on the technological need (Barreca, 2000). The need could range from purely functional necessity to customer expectations—think of your old phone that can no longer open the websites you want due to advanced browsers that require newer operating systems or other struggles with modern mobile applications.

For SEPTA

To combat obsolescence, SEPTA went through the process to create a system that is friendly to users and accessible. SEPTA Key called for an overhaul of SEPTA and a glimpse into what the future of transit can be with Regional Rail fares. SEPTA General Manager Jeff Knueppel in an interview with PlanPhilly described the massive amount of hardware and software needed for implementation: “millions and millions of lines of code,” 1,850 onboard fare processors, 350 vending machines, 650 turnstiles, 550 platform validators, 300 parking payment stations, 480 handheld sales devices, 1,200 offsite card purchase locations and 2,000 card reload locations (Saksa, 2015).

The fear of obsolescence then affected the decisions that guided delays in implementation. By seeing what other organizations adopted, SEPTA asked for changes in their
deliverables. As stated, before the first contract was signed, SEPTA created 26 addenda (Saksa, 2015), mostly to compensate for the change in technology over the delay. Once the contract was signed, formal change orders further altered the document ten times; these additions to technical specification made the document grow from 888 pages to 922 pages (Saksa, 2015).

To the public, these additions seem to add to already compounding delays. And it does seem that SEPTA is not aware of how these additional technological changes would affect the timeline. During an interview with PlanPhilly, Nasser Tehrani, a senior project manager at Technology Evaluation Centers who specializes in managing business process overhauls like fare payment system upgrades, states “one of the huge risk factors [in these projects] is really from the beginning, which is to come up with a very clear and solid scope [of work]…. If this type of initiative [SEPTA Key] is lacking a clear and solid scope, it will definitely go wrong” (Saksa, 2015).

The scope creep caused by playing catch up to technology put SEPTA in an incrementalist position where they could never truly assess the risk and issues. SEPTA could not approach their decision-making process with a clear vision for their goals and therefore could not appropriately assess how technological change would affect the end product of the Key.

Some of the change orders were small, like increasing the number of customer kiosks or adding more turnstiles to the final set of deliverables, while ACS initiated others in response to issues they did not foresee, such as changing mobile operating systems that will interact with the open payment system (Saksa, 2015). These technological issues created change orders of 134 pages, increasing the overall cost of the project from $122.2 million initially to $140.6 million in 2013 (Saksa, 2015). Along with increasing the price, these decisions pushed back deadlines. The deadline for finishing Phase 2, which included launching SEPTA Key on subways,
buses and trolleys, was extended to June 30, 2014 from an original date in February 2014. The deadline for Phase 3—implementation on regional rail and in SEPTA’s parking lots—was pushed back to December 31, 2014 (Saksa, 2015). Acknowledging the delay, SEPTA officials conceded that all implementation might not be complete before 2017, and as of completion of this thesis, full implementation has not occurred.

Analysis

Technological obsolescence will affect the life cycle of the new medium. It is essential that SEPTA considers this as it moves forward with each decision. After spending all the time, effort, and finances for the Key system, this dedication to creating a functioning system will prolong the life of the new fare medium. For SEPTA, the best way to overcome obsolescence is to complete their functioning system for the public. The approach to ensure that all components work will create a structure that can survive beyond a short life-cycle. The open-ended nature of SEPTA Key and especially the Key readers will allow for new code to be added in order to adapt to future changing technology in addition of new phones or new media that require taps. The customer will hopefully forget the bumps along the way, as the new payment system becomes the habitual norm. If any city can deal with technology that has gone out of style, it is Philadelphia, and that can be seen through their use of tokens.
Table 4 Technological Obsolescence Decision Table

<table>
<thead>
<tr>
<th>Decision-Making Questions</th>
<th>SEPTA Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>How did the agency make their decisions?</td>
<td>As the last major transit agency to transition to a contactless fare card, SEPTA was starting closer to the end of the life cycle than its peers. Due to this, it had to make decisions to prolong that life cycle.</td>
</tr>
<tr>
<td>What is the decision?</td>
<td>As is the case for many of the issues leading to delays, SEPTA decided to forgo timeliness for an assurance that the system would function as it should.</td>
</tr>
<tr>
<td>How should the decision be evaluated?</td>
<td>While the delays are frustrating and the technology might seem novel to some, the life cycle can be prolonged by the ability to have payments on a central server to allow for easily replaceable cards and an open ended system to allow for new physical mediums.</td>
</tr>
<tr>
<td>What made this decision the appropriate decision?</td>
<td>By being late, SEPTA had to innovate to prolong the life cycle of SEPTA Key. Being late also allowed SEPTA to be cognizant of issues found in other transit systems in order to avoid the mistakes of its peers.</td>
</tr>
</tbody>
</table>

Bureaucratic Inertia

In Public Agencies

A bureaucracy is a "system of administration marked by officialism, red tape, and proliferation."\(^3\) The public can view bureaucracy as additional component that interferes with desired goals. Bureaucratic inertia is the inevitable tendency of bureaucratic organizations to perpetuate the established procedures and modes, even if they are counterproductive and/or diametrically opposed to established organizational goals (Neville & Burgis, 2013). This inertia

\(^3\) Definition from Merriam-Webster
then leads the bureaucracy to face inefficiency, incompetence, ritualism, and the so-called red tape that is viewed negatively by the public.

For SEPTA

Although the bureaucratic system is in place to ensure compliance and quality, SEPTA’s bureaucratic structure has led to delays. As a truly regional transit agency founded by the state, SEPTA has to combat political and operating issues. First, SEPTA board members come from various counties in Southeastern Pennsylvania. Suburban counties use public transit differently from the urban core of Philadelphia; suburban counties rely heavily on Regional Rail and thus vote for those improvements, while the urban core focuses on higher levels of services (on-time performance and non-packed vehicles) and lower fares (Mistretta, Goodwill, Gregg, & DeAnnuntis, n.d.). This disconnect causes political friction, not only at board meetings, but among the rest of Pennsylvania as they ask the state for funding when rural counties do not see that as their priority. The location and economic importance of Philadelphia creates interdependence with Delaware and New Jersey. Since there is little collaboration between the municipalities, Philadelphia bears much of the cost while the other two states enjoy benefits.

Labor unions and labor disputes could add to the delay, creating another component for the bureaucratic system to handle. In order to keep a good number of employees who were token distributors, SEPTA had to transition these employees into a new role. In other agencies, this meant repositioning them as Customer Service Agents (CSA) who guide customers in the stations and through any issues that may arise. For the initial phase of implementation, CSAs are meant to guide the customer through the process of procuring and using SEPTA Key.
In some instances, the inertia is beyond the control of SEPTA and is dependent on economic forces. Explicit penalties could be a deterrent to expand the project and to adhere to strict deadlines. While missing the deadline creates a fine for ACS, the true amount is not yet known, as Phase 3 has not been completed. The contract with ACS requires liquated damage payment for every day past the deadline until each phase is complete: $3,700 per day for Phase 1, $10,850 per day for Phase 2, and $18,150 per day for Phase 3. SEPTA accepted Phase 1 deliverables October 31, 2014, 304 days after deadline (Saksa, 2015).

While such penalties should enhance the possibilities of adherence to a deadline, there are caveats in SEPTA’s contract that makes this penalty more lenient. The contract has a cap on the liquated damages, which is set at 10 percent meaning that most SEPTA could legally claim is $14.6 million (Saksa, 2015). To add to this “soft” cap, the language in the contract is not explicit enough to determine if the damages are cumulative meaning that the penalty could be substantially less than $14.6 million (Saksa, 2015).
While it seems that these issues are entirely controllable and fixable by SEPTA, the nuanced truth is that these caps are needed due to external economic forces. The liability cap exists to attract bids because of favorable terms for the bidders; SEPTA only had three bidders, and the market does not have that many firms who specialize in fare technology. Liquidated damages are used to avoid costly lawsuits over contract breaches by asking for payments. The perceived frustration is that SEPTA lawyers chose this provision at 10 percent without any negotiations with firms as should be done through a thorough a rational cost benefit analysis. This cap makes an unrealistic timeline more likely from bidders as the final damages would not be that great (Saksa, 2015), as once the limit is reached, additional delays do not add to the cost.

Analysis

The actual decisions that SEPTA can make are limited through bureaucratic inertia, leaving SEPTA with fewer possibilities. Though the initial analysis includes this knowledge, there could be alternatives that are not possible due regulations surrounding the agency. Would a higher liability cap have helped adherence to the deadline? Possibly, but this would require a different analysis and decision-making process from SEPTA that could create unforeseen delays. As for the public perception, this adds to initial distrust of SEPTA. However, the relationship between the public and SEPTA is not damaged by these limitations as generally policy makers and transit enthusiasts have this intimate knowledge.

Ultimately, this red tape helps SEPTA continue to function. Without such limitations, a transit agency would be unyielding in their expansion. The regulations and structure help SEPTA accomplish its main goals to serve the riders of the Philadelphia metro area. The slowed down process caused by the inertia then allows SEPTA to constantly reevaluate their priorities and decision to ensure that SEPTA is not pushed into a corner with the implementation.
How did the agency make their decisions? In order to move forward, SEPTA had to navigate these constraints caused by limitations, regulations, and general hierarchy within bureaucracies. While these regulations are designed to limit how it can expand, SEPTA pushed forward with their new technology.

What is the decision? Their decision was to change the token collectors to deal with labor issues, acknowledge that deadline issues might happen due to contract limitations, and to politically navigate the approval and implementation by both the SEPTA Board and Pennsylvania government.

How should the decision be evaluated? This decision should more be seen as the ability to move past the limitations rather than being brought down by delays.

What made this decision the appropriate decision? These decisions helped the eventual implementation rather than being stuck in a payment limbo like SEPTA was before 2007. As stated above, tokens still worked, and SEPTA moved forward with SEPTA Key.

### Technical Issues

**In Public Agencies**

The delay and increments could best be explained as a measure to limit technical issues—card read errors, machine malfunctions, inaccessible websites, and an integrated transition. These possible issues could be attributed to one overarching factor: software engineering and coding. While the public might see this as an easy fix as the addition of a new mode only requires the addition of new code and integration, this is not the case, as simple addition might crash a system.
In an interview with the PlanPhilly, David Schuff, professor of management information systems at Temple University’s Fox School of Business, stated that the intricacies involved in developing at this level increases exponentially with each layer. He asserted, “You’re taking [six] different processes and making them into the same one” (Saksa, 2015).

To ensure a successful launch after the beta, SEPTA slowly released aspects of their new fare payment. SEPTA Key began as a pilot for 10,000 users to use the Key as a weekly pass and then a monthly pass that could only be bought at one location (SEPTA, 2016). Eventually, other locations began to sell the pass with the same limitations. As the bugs were discovered and fixed, the other features of SEPTA Key increased. As web bugs were fixed, the accessible parts of the website increased, from registering the card to being able to reload and buy passes online (SEPTA, 2016). Eventually, SEPTA Key allowed riders to buy single ride tickets at vending machines with credit cards and use them on Key readers, which increased accessibility (SEPTA, 2016). The current phase of the Key has the Travel Wallet available, which allows for direct funds to be applied and for the rider to use it as a fare (SEPTA, 2017).

It is essential for SEPTA to be diligent with debugging the system, as serious bugs could affect the security of user’s private information, revenue accrual, and fraud prevention (Secure Technology Alliance, 2017). The issue might seem fixable to the public, but SEPTA’s inexperience with new technology could lead to delays. Unlike other systems, SEPTA has never had a ubiquitous magnetic strip card that provided pay-per-ride technology. As such, there was never a need to develop and understand the complexity of coding that is required for implementation.

A parallel in transit for the implementation is Philadelphia’s peer to the north, New York in lacking countdown clocks, the displays that inform riders how long it would be until the
next vehicle occurs. James Somers, in an article in *The Atlantic* (2015), pondered why New York City could not create countdown clocks after many attempts. He discovered that the Metropolitan Transportation Authority (MTA) had outdated signals making it hard to realize which specific train is crossing the signal and thus not being able to display an accurate countdown. The MTA also realized that they did not have the knowledge within the department to fix the issue for buses. After outsourcing the problem in the 1990s and 2000s, it took a “small team of software-savvy MIT grads to come in-house and manage the bus project.” This small team was able to design and bring in the needed contractors to build the needed components to release “BusTime” within a year in Brooklyn.

“Having full-time software experts running the show turned out to be crucial. Previous incarnations of the project didn’t have a technical leader at the MTA—just old-school senior managers who would try to wrangle the contractors by force of will,” wrote Somers. “The new in-house team, by contrast, was qualified to define exactly what they wanted from software providers in terms those providers could understand. They were qualified to evaluate progress. They could sniff out problems early” (2015).

MTA did not have a strong structure to support their decision to create a countdown clock. It was not until they realized their lack of knowledge and looked outwards to fix the issue that they accomplished the goal. Similarly, SEPTA could not define what they desired in their technology because they were unaware of the scope and the needs until deep into the process. Such decision-making relies on incrementalism to fix the problem at hand for each step of the implementation.

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4 The subtitle for the article is this quote: “I honestly just wanted to know why the F train didn’t have clocks. I never expected it to be so complicated.”
This lack of coding expertise stands in contrast with the technical expertise that exists at SEPTA. For infrastructure projects, SEPTA has had the in-house expertise to accomplish a task before the deadline and under the project costs: building new stations (Benshoff, 2015), separating tracks (SEPTA, 2015), renovating bus loops (Fisher, 2013), rehabilitating bridges (Worrell, 2015), replacing catenary wire (SEPTA, 2015), or installing $330 million safety systems (Saksa, 2015). SEPTA began these projects with the necessary engineers in the initially planning meetings. However, software engineers were not involved in the discussions of the procurement process of SEPTA Key, leading to these delays.

Analysis

There is an upside to this delay. The slow implementation has made for a better user experience. Furthermore, being late to this game allowed them to foresee issues that other organizations faced: changing cellular technology and the slow adoption of contactless payment method. SEPTA is in a good position moving forward. SEPTA Key is designed to be an open system, meaning any contactless card or smartphone equipped with Near Field Communication (NFC) technology could use it. “This is a single, multiphase project that will contain everything,” says Schuff. “They’re trying to create a system now that they don’t have to redesign for the next phase. So, they need to take into consideration everything they want to do in the future, [right] now” (Saksa, 2015). Moving forward, SEPTA should include software engineers for additions to the system. They started this process by having an in-house testing room at their main offices in Philadelphia to debug and combat technical issues.
### Table 6 Technical Issues Decision Table

<table>
<thead>
<tr>
<th>Decision-Making Questions</th>
<th>SEPTA Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>How did the agency make their decisions?</td>
<td>The design of the timeline without software engineers led to a delay in the implementation of the Key due to a lack of technical expertise. From that, SEPTA moved to an incrementalist approach.</td>
</tr>
<tr>
<td>What is the decision?</td>
<td>Rather than making one big push of all the technical aspects available on SEPTA Key at the release, SEPTA released each new feature slowly, ensuring its functionality.</td>
</tr>
<tr>
<td>How should the decision be evaluated?</td>
<td>While technology is an exciting toy for the public, backlash occurs when the product does not work well. Rather than rushing through the implementation, SEPTA made sure that when the card was tapped, it provided the service that was required, trying to keep the riders commute uninterrupted.</td>
</tr>
<tr>
<td>What made this decision the appropriate decision?</td>
<td>While the visible aspects of the SEPTA Key implementation, like new kiosks, frustrated riders, it did allow for SEPTA to realize what the issues were. The long pilot program allowed for transit enthusiasts to use the medium before rolling out to a general public. As before, SEPTA traded some public backlash for a working system.</td>
</tr>
</tbody>
</table>

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**Lack of Champion/Unclear Goals**

In Public Agencies

Normally, lack of champion and unclear goals would be two separate issues within public agencies. However, for SEPTA these are interlinked as there did not seem to any goal to achieve and without that goal, there was no individual or group to push SEPTA towards it, a transportation chicken and egg. A clear goal can remain unaccomplished without a strong advocate to push it through as the details could create confusion and bickering. Furthermore, the other components of the SEPTA Key delay mentioned in this paper cannot be overcome simply with a clear goal. Perhaps the strongest metaphor is in sports where all teams have the
goal of winning a championship, even if it sometimes takes 108 years. Without a strong front office making decisions towards this goal or a management team that creates the strategy that maximizes win probabilities or a transcendent player that pushes their team to the brink, the team will continue to wait another year to raise a trophy. Sorry, Cleveland.

The reverse is also true. A strong advocate can have a great voice, but without a clear goal, that advocate is advocating for nothing. It could push an agency to many different goals and projects that marginalizes any impact that could possibly be had. A brash leader in the business world can push for products that the company should not be making and through that take necessary resources away from a clearer goal. Steve Jobs pushed for a new computer, the LISA, that ultimately did not sell well and went against what Apple’s board desired for the company. Eventually, Jobs was fired so Apple could focus on the products that were more profitable.

When a goal and an advocate are in sync, a project or organization can best move forward. Apple fared worse without Jobs and in the late 90s he was rehired to run the company. With the advocate and goals now more under Jobs’ control, he pushed the company to rebrand itself, innovate music technology, and move towards a distinct mobile platform making it one of the most valuable companies in the world.

For SEPTA

Tokens could still be used for SEPTA even with these changes; it remains a resilient medium. Throughout the implementation process, there appears to be little explicit desire from the average SEPTA rider for the new fare payment method. Employees who understand transportation planning enjoy the control that SEPTA Key provides and the new data that comes with the card. Transit enthusiasts like the ability to pay with a medium available for more
than a decade in some cities. Politicians might like it for the branding that it can bring Philadelphia as an emerging city. However, there has been little discussion to the average user about these benefits. Without somebody or some organization advocating loudly for the transition, there remains little incentive to move forward.

The benefits that SEPTA Key brings, with possible exception of better revenue control, do not necessarily make the project a top priority for SEPTA. Tokens work well enough in transit to survive this long, as seen in Kuala Lumpur and Toronto. Although there might be theft and fraud, this has been kept under wraps for decades—bad publicity surrounding tokens, thorough audits, or competition, if it existed, rarely occur, making the revenue leakage from token “misplacement” a high-priority issue. Instead of random individuals, SEPTA employees or those with connections perform most of the fraud, so SEPTA can police the situation.

A possible goal for the implementation of SEPTA Key would be to ensure that the new fare medium is accessible for all riders. Advocates are needed to fight for accessibility, the ease of reaching goods, services, activities and destinations (Litman, 2017), with SEPTA Key. Many bus-only customers who will use the Key will have to go to SEPTA rail stations to add value to their cards or add value online. This may increase accessibility, but not all customers use computers or have access to computers or smartphones. Eventually, NFC technology will allow the use of contactless credit cards, debit cards and prepaid cards to pay for all fixed-route public transportation. Again, there remain questions of accessibility.

Analysis

Lack of a champion and stakeholder involvement can cause projects to be challenged. Since there is no grand vision, scope creep can occur adding to the delays. A champion can advocate for what is needed to fulfill the implementation and to determine the order that these characteristics should be released. Without a direct and explicit goal, passengers see the
changing infrastructure, wonder how that will change their commutes, and then experience frustration with delays. While SEPTA mitigates this by explaining that they want to ensure that the technology works, riders may not see the additional benefit when tokens have worked well for them in Philadelphia.

Table 7 Lack of Champion/Unclear Goals Decision Table

<table>
<thead>
<tr>
<th>Decision-Making Questions</th>
<th>SEPTA Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>How did the agency make their decisions?</strong></td>
<td>The unspoken truth for SEPTA is that tokens still work well for its day-to-day operations. While other agencies have used magnetic cards to allow for better data to restructure their transit system, it seems that SEPTA never made this goal explicit. They also were never explicit if their goal was to increase accessibility or to simply catch up with the rest of the country.</td>
</tr>
<tr>
<td><strong>What is the decision?</strong></td>
<td>The decision is to move forward with the implementation. However, there was no explicit reason to the public for this technology.</td>
</tr>
<tr>
<td><strong>How should the decision be evaluated?</strong></td>
<td>It is hard to evaluate this decision. A champion or clear goal would have pushed SEPTA to a stricter timeline. If the goal is to release Key to as many of the riders in order for SEPTA to gain more data, then it is probable that SEPTA would move for the readers to be the first part that is ready, especially for buses.</td>
</tr>
<tr>
<td><strong>What made this decision the appropriate decision?</strong></td>
<td>The decisions here are lost within the other constraints. With a clear goal, SEPTA could see how that goal interacts with the regulations and limitations that exist.</td>
</tr>
</tbody>
</table>
Risk averse Culture

In Public Agencies

Due to the public nature of the projects and commitments these agencies are involved with, there seems to be a natural risk averse culture (McNichols, 2016). Since funding comes from government subsidies and tax dollars, there is a political incentive to deliver a tangible finished product (McNichols, 2016). The easiest deliverables are those with the least risk and are more readily accepted as a goal for public agencies. Future political ramifications for failing to accomplish their goals also leads to a risk averse nature. Furthermore, peer organizations failures can become benchmarks that are to be avoided.

For SEPTA

As Philadelphians see infrastructure for SEPTA Key, frustrations arose as to why riders could not begin to use the new medium. SEPTA purposely took the time to implement their Key, making sure everything was in place, to avoid replicating Chicago’s mistakes. In an interview with Billy Penn, SEPTA Key spokesman Andrew Busch said, “It’s not us necessarily being critical of Chicago, but our intention all along was that we know people are anxious to use the system and want to get it rolled out. Our process is focused on making sure that we have everything working the way it should” (Orso, 2015).

The Ventra Card, Chicago’s parallel to SEPTA Key, launched in August 2013 (O’Neil, 2013). It can be registered, reloaded online, through the phone, or through vending machines, and can hold value or time-based fares. The initial issues came when riders who paid by touching their whole wallet to the reader got charged on the Ventra Card and on other contactless cards that are in the wallet (Hirst, 2013). Along with being double charged, some riders found that their cards were not being read correctly and required multiple taps before
allowing the fare to go through and the passenger to proceed to their ride (Hirst, 2013). This made boarding more difficult and time-consuming than it was before Ventra was implemented, negating the expected benefits of smart cards due to gains in efficiency.

In addition, Chicago Transit Authority (CTA) riders found their ability to talk to customer service more difficult. Customer service hold times were over six minutes, above the desired goal of the agency (Sudo, 2013). CTA’s internal metrics show how the rollout did not meet their initial targets (Sudo, 2013)

After the fumbled initial implementation issues, Ventra encountered more difficulties. According to a Chicago Tribune (Hilkevitch, 2015) article:

The mysterious hardware or software problems Wednesday evening, which the CTA attributed to a “Ventra back-office server,” resulted in an estimated 15,000 free rides for customers who were waved through the gates after showing station attendants their Ventra cards, the transit agency said.

The disruption did not affect fare collection on CTA Chicago Cards or CTA magnetic stripe cards, the CTA said. Customers using those fare cards were required to pay to ride, CTA spokeswoman Tammy Chase said.

CTA officials emphatically said the agency will bill the Ventra contractor, Cubic Transportation Systems, Inc., for the lost fare revenue. The tab would be up to $33,750, assuming all rides were based on the $2.25 full fare.

Further issues happened during implementation, which caused the CTA to ask for reimbursements, as seen in the same Chicago Tribune (Hilkevitch, 2015) article:

The company agreed to reimburse the CTA roughly $1.2 million after malfunctions with Ventra equipment between Oct. 1 and Dec. 19 of 2013 resulted in the CTA giving away nearly 1 million free rides. … Cubic also saw its revenue stream squeezed in late 2013 when the CTA slowed the full transition to Ventra from the old CTA-run fare-payment system and withheld payment to Cubic until the myriad shortcomings were substantially resolved.

The implementation issues in Chicago were enough to cause SEPTA to be cautious in their implementation. While the CTA was able to influence reimbursements, this is due to the
size of their transportation network, a luxury that SEPTA does not have. Therefore, it became important to avoid backlash from a faulty implementation and to test and ensure that each promised aspect worked as the rollout occurred. This meant a very thorough incremental approach to see what code is working, what infrastructure is in place, and which CSAs are ready to help the transition.

Added to this was SEPTA’s awareness of the increasing costs that the CTA faced with its contract. Unlike SEPTA, the CTA is not fully integrated in the metro area with suburban bus and commuter lines falling under another agency, which inflated the original cost of the new fare medium contract. Add-ons from regional transportation agencies in and around Chicago increased the contract’s cost from roughly $454 million to nearly $519 million (Hilkevitch, 2015). However, SEPTA, by having more modes under the control of the authority, is at an advantage and an explicit desire is to be able to integrate all modes to SEPTA Key.

Like SEPTA, reflection on the decisions made leaves outsiders confused. From the previous Chicago Tribune (Hilkevitch, 2015) article:

When the CTA decided more than five years ago to start looking for a system to replace the popular Chicago Card smart card and transit cards with magnetic stripes, one factor cited was the high cost under the CTA’s existing contract with Cubic to add more transit card vending machines and to upgrade software. The CTA discovered early on that it was locked in to purchasing extra equipment and software updates from Cubic, because the technology is proprietary…. Yet in 2011, despite a competitive-bidding process that attracted several vendors, the CTA awarded another contract to Cubic to create Ventra.

It seems that the CTA is disjointed with its goals, especially with extending their relationship with Cubic where there were problems. However, with time these errors became a laughable memory of the CTA and what mattered is the ability for the transit system to provide service.
Analysis

The risk-averse nature of SEPTA, aided by the CTA’s issues, probably helped the most with the actual implementation. By being cautious, it ensured that all aspects of the medium work as they are supposed to. The public perception will eventually get fixed, but additional costs would hurt the system more. It has been almost four years since the Ventra Card fiasco, but the system remains in place for Chicagoans. Though many remember the implementation issues, it becomes something to laugh about; the same could be true for Philadelphia. The lessons learned from CTA showed SEPTA how to cultivate its image through the process handle the message to be portrayed to the daily rider.

Table 8 Risk Averse Decision Table

<table>
<thead>
<tr>
<th>Decision-Making Questions</th>
<th>SEPTA Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>How did the agency make their decisions?</td>
<td>On top of the normal risk averse nature that a public agency has, the parallels with CTA made SEPTA more cautious about its implementation.</td>
</tr>
<tr>
<td>What is the decision?</td>
<td>Due to the release issues that the CTA faced, SEPTA decided to slow down their implementation. The tradeoff is the benefit of having an implementation with less public backlash and creating financial loss.</td>
</tr>
<tr>
<td>How should the decision be evaluated?</td>
<td>Avoiding risk should result in a beneficial output. In this instance, SEPTA’s explicit nature of its delay helped it along since the daily commute was not disrupted.</td>
</tr>
<tr>
<td>What made this decision the appropriate decision?</td>
<td>Public backlash should eventually die down, as it did in Chicago. For SEPTA, the delays are still an issue it can move past as long as the system functions as planned. This decision will continue to be evaluated as the implementation continues.</td>
</tr>
</tbody>
</table>
Chapter 4
Limitations

This thesis explored how decisions are made at the incremental level due to a lack of information or an immediate need to accomplish the next task. As SEPTA dealt with deadlines to meet a certain goal, so did I to write this thesis. As such, I was limited in my approach and could not dive into the topic in a way that I initially intended to. The following chapter explores these limitations, the implications of them, how to improve this study, and after the implementation of SEPTA Key is complete, what this could mean for the agency.

The biggest limitation for this thesis is the lack of direct conversations with SEPTA officials and advocates for the new fare medium. Although I reached out and had some conversations, no SEPTA worker would go on record due to the continued implementation of SEPTA Key. As I finish my current research, it makes sense that no worker would want to go on the record as they want to control the narrative. Each media interview and press release are controlled in a manner to state that each delay is deliberate in achieving an implementation with little technical errors. On the record interviews would provide more intimate details on the topic, providing a greater understanding of the reasoning behind these decisions.

When I discussed the thesis informally with coworkers from the transportation consulting firm and the transit agency I worked for, my peers had many theories to the delay. Though I did not realize it at the time, individuals are more willing to provide opinions for other institutions and compare their experiences. Taking a step back and expanding the pool of those whom I contact would help understand large-scale projects in transportation organizations. Other organizations have changed their fare media and are done with the process, meaning that it is more likely for them to talk about the process. From these conversations, more parallels to the decisions that SEPTA made could be seen, and a deeper understanding of the reasons for
delays can be developed. This does not have to be limited to fare payment technology changes; New York City expanded subway lines recently and dealt with similar delays and public perception issues that Philadelphia faced during implementation.

A means to assign value to nonmonetary aspects would help to quantify the decision-making process. There are a lot of missing variables for implementation. The monetary value of public perception does not exist, and therefore rational analysis to see how long a public can tolerate a delay cannot be performed. Other externalities that cannot have a quantified value include the bureaucratic inertia that SEPTA could not escape, the rate of adoption of SEPTA Key, the rate that technology changes through the timeline, and the determination of how passengers accept the benefits of the new fare medium. Adding such values would provide a quantifiable measure to the implementation and to help public institutions better determine their decisions.

Perhaps the biggest limitation to this study is that as of the completion of this thesis, the implementation is still ongoing. While I have seen the current reasoning behind the delays and certain aspects that prolonged this delay, as long as the implementation is not complete there could be more delays. The next steps that SEPTA has released on their website is the ability to use the Key as a form of debit card (SEPTA, 2017), as a means to provide banking options to the riders who have lower income, and to provide a means to pay fares for the commuter rail line, Regional Rail (SEPTA, 2017). These are major initiatives for SEPTA and would put the agency ahead of all their peers after falling behind for the implementation of a new fare card medium. The CTA attempted to allow a debit card feature on their Ventra Card and while the effort still exists, the support for this feature has been largely abandoned. As mentioned before in this thesis, a payment system for Regional Rail will be the first to accomplish this in the
world. Assuming that SEPTA wants to control the public response, these big programs will continue to face delays to ensure that they function fully once released.

Final Summary

SEPTA Key’s delay is a story of constraints faced through bureaucracy, a lack of knowledge of the true cost, missing champions to appreciate the full scope of the process, and yes, perhaps just Philadelphia being Philadelphia, however justified that perception is of a city known for its aggressive fans, of throwing snowballs at Santa Claus, of being in the shadows of New York, and falling to its insecurities as the “Sixth Borough” (Pressler, 2005) Through various decision-making theories and models as they pertain to public agencies, I examined the public-facing decision-making process to see how the possible tradeoffs and the reasons that continuous delays occurred. Although the fare medium is unique to SEPTA, these delays are similar to those faced by other agencies in expanding their service, creating a new subway line, or adding a new mode.

The overall lesson is that there is still something to appreciate about taking the time to ensure that the process fits the goal, however unclear it may be, to provide a service for a city. It can be further broken down by each of the delays that have been discussed:
Table 9 Solutions for SEPTA

<table>
<thead>
<tr>
<th>Issue</th>
<th>Possible Solution(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of funding</td>
<td>For public transit agencies, the top goal should be to provide transit service for riders. Due to this, SEPTA should reassess the goals for new technology and if moving forward with it disrupts day to day operations.</td>
</tr>
<tr>
<td>Scope Creep</td>
<td>Create a strict timeline after figuring out the most prominent goals and adhere to it. The best way to this is to have all the stakeholders and knowledgeable workers who understand the possible delays to collaborate in creating this timeline and plan.</td>
</tr>
<tr>
<td>Technological Obsolescence</td>
<td>Create a sound technology system that can adapt to prolong the life cycle. For SEPTA, the late entrance to the technology ended up being beneficial as it saw better than their peers how technology is changing.</td>
</tr>
<tr>
<td>Bureaucratic Inertia</td>
<td>Understand the limitations that the organization has and how to move past them. SEPTA transitioned well for their token collectors, but the final implementation will determine leverage. A successful Key will provide tangible proof for political assistance from Pennsylvania and give the organization future leverage for new projects.</td>
</tr>
<tr>
<td>Technical Issues</td>
<td>As with technological obsolescence, technical issues can be solved by having the right employees who can understand future issues at the initial meetings. As software engineers were not present, the timeline did not reflect the difficulties that coding provides. SEPTA should follow the example it sets with infrastructure.</td>
</tr>
<tr>
<td>Lack of Champion/Unclear Goals</td>
<td>SEPTA should be very clear in the expectations that implementation will bring. For transportation planner, the data will help guide decisions. However, accessibility to the Key can create biased data which goes against the goal of the agency. Ultimately, a strong goal with a knowledgeable champion can ease delays by providing a deadline that resources move to accomplish.</td>
</tr>
</tbody>
</table>
Risk averse Culture

| SEPTA benefited from learning from peer institutions and the deliberate delays helped avoid the mistakes of the peers. The delays were issues that they could accept. The continued implementation will continue with these safe steps to make sure that Regional Rail fares and the debit card functions work well for commuters. |

Through each category has led to separate issues, everything is interdependent. The delay is not easily delineated by categories. Each category has impacted other categories, making it difficult to prevent future delays. For example, the technological limitations affected the scope creep making the project bigger, which brings about funding issues.

Through this, the traditional project management triangle has shifted for Philadelphia. The triangle puts competing aspects at each corner with opposing aspects that pull on each other. It is designed to realize that sacrifices must be made to keep the project moving forward. From cost, schedule, and scope, which influence the decision-making process, there is a balance of self-prejudice/doubt caused by an East Coast biased, unfair perceptions of the city of Philadelphia and that SEPTA retained the token far longer than any of its peers, uncertainty, and communication between the public and the authority for SEPTA. It moves towards the second triangle as the implementation moves forward, sacrificing some negative publicity for ensuring the fare payment. Sometimes scalene, sometimes isosceles, but never equilateral, this triangle required a new balance for the agency.
Figure 6 Traditional Project Management Triangle

Figure 7 Adjusted SEPTA Key Project Management Triangle
As of the conclusion of this thesis, SEPTA predicts that the full implementation of SEPTA Key will be complete in December 2018. Until then, SEPTA still has to phase out their tokens and magnetic strip cards and build an app that is compatible with all mobile operating systems (Laughlin, 2017). In an interview with the Philadelphia Inquirer, O'Brien summarized their approach to the website which mirrors their overall approach: “we just want the basic website functioning for our customers before we get too fancy” (Laughlin, 2017). In the same article, Schuff praised their approach by acknowledging the frustration but stating that the approach has minimized issues. “I don’t think it’s discouraging,” he said in the article. “It’s probably in their best interests to roll things out piece by piece” (Laughlin, 2017).

The complete implementation of SEPTA Key will change the transit agency, making it exciting to observe for transportation planners. Their cautious approach has seen an implementation with delays but with minimal technical headaches. The completed phase out of tokens to a card-based system will move SEPTA more beyond their peers, making the delays worth the full implementation of all its goals and creating a unique Philly jawn.
References


