SMARTCOLUMBUS

Kiosk Common Payment System

Research Findings

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Executive Summary

To aid Columbus with reaching its goal of becoming a smart city, our student research team has studied kiosk designs, common payment systems, and multi-modal trip planning programs both in the U.S., and the Netherlands. The Columbus Common Payment System (CPS) will make it possible for travelers to move around Columbus conveniently, with the use of one payment card for all public transportation options. The transportation systems that would be included in the system are COTA, car2go, bike share providers, and other personal transit options such as UBER, and Lyft. The common payment system will be accessed through a freestanding kiosk located near existing pylons at the major COTA bus stops and hubs, such as the Northland Transit Center, and the Northern Lights Park & Ride.

To help determine the best kiosk design for Columbus stakeholders, we have completed a thorough benchmarking analysis to study leading cities: Chicago, Seattle, and Amsterdam. We then followed-up through interviews with representatives from these selected cities, as each has a unique kiosk design and public transportation system that proved beneficial to our benchmark research. The goal of a common payment system isn't too increase the number of residents using public transportation, but instead to make it more available to consumers. With these research findings, our team recommended a common payment system that will be available to all of Columbus. We have also recommended the 'CBus Card', giving travelers access to the trip planning module, and the ability to pay for more than one trip at a time with one card. With advancements such as the kiosk, common payment system, and CBus Card, the City of Columbus can further their position as a smart city, and increase access to all public transportation systems.

Introduction

The city of Columbus needs a Common Payment System (CPS) to assist the many people who are dependent on public transportation systems to navigate the city. There are 860,090 people living in the City of Columbus, and the population is projected to grow consistently in the foreseeable future (US Census Bureau). For being a highly populated city, there is room for advancement and acceleration in public transportation efficiency. In 2016, Columbus won the Smart City Challenge and received a federal grant from the Department of Transportation for 'smart city' developments. City officials intend to put this funding into projects that are reinventing mobility in Columbus, and improve the overall quality of life for residents. The Central Ohio Transit Authority (COTA) is the public transit provider for the greater Columbus area, services an area consisting of 1.2 million residents, and completes roughly 18 million passenger trips annually (COTA, 2017). The CMAX is the region's first rapid transit line, and is a new service that COTA provides. The COTA is a helpful and reliable service, but is limited to taking residents to specific stops and locations along bus routes. This leaves for a lot of area to be covered by residents on foot, which is also known as the 'first-mile/last-mile' problem. Having a common payment kiosk will make it more convenient for people to plan multimodal trips, and make it to their destinations more safely and efficiently.

Research Goals & Objectives

Our overall project goal was to develop a user-friendly Common Payment System (CPS) for the City of Columbus that allows for a single card to pay for multi-modal transit options. To meet this goal, we focused on four key objectives: incorporate existing survey data into planning of prospective kiosk infrastructure, compare options across existing common payment system's to determine the most efficient, determine design options for the kiosk, and incorporate multi-

modal transportation information and planning into the kiosk. We hope our results will help improve the ease of paying for public transportation, and increase social equity in Columbus by installing a proxy that makes planning multi-modal trips easy using public transportation options.

Motivation and Background Information

City of Columbus officials have identified the Linden community as a key area of focus for Smart Columbus projects. Smart Columbus wants to be able to move the conversation from 'for' Linden, to 'with' Linden (Smart Columbus, 2017). The residents of this community are key stakeholders as they are a part of the Columbus population that most heavily relies on public transportation. In February of 2017, a meeting was held, 'Smart Columbus Connects Linden', which helped to gauge the thoughts and perspectives of Linden residents regarding city transportation, and other local concerns. From this, city officials learned that most Linden residents (34%) currently pay for transportation services with cash (Appendix A, Smart Columbus, 2017). This was important because the City of Columbus aims to develop a kiosk that does not collect cash directly into the kiosk. Linden residents also noted that their highest ranked transportation concern is the lengthy trip time, and opting to not take the bus because of the time it takes to reach their destination (Smart Columbus, 2017). Being aware of these key areas of concern helped us outline a baseline of needs for the City of Columbus, and create a list of questions to ask when interviewing city representatives and agencies in our benchmark cities

The 'first-mile/last-mile' transportation services are insufficient in the Linden community as the COTA bus stops are often too far away from residents' homes and jobs, making the trip-planning feature a key focus for our research project. City of Columbus staff have learned from the Linden residents that there is a need for a universal payment system, which will address the inconvenience and stressor of carrying exact change to pay for bus and transportation fares

(Smart Columbus, 2017). Subsequently we tailored our project to develop a kiosk design that incorporates both a secure common payment system for the City of Columbus, as well as a reliable trip planning application to get residents to and from their destinations as efficiently as possible.

Research Methods

We undertook benchmarking and interviewing methods to better understand the transit systems and kiosk designs of other cities. Initial research entailed pinpointing which cities at a global level have advanced transit systems, and then choosing which best suited the characteristics and needs of the Columbus area. We chose Amsterdam, Chicago, and Seattle as our benchmark cities for further research. Seattle was chosen as a benchmark city because it is comparable in size to Columbus, and has technology to store transportation value (the E-purse) which could be a good model for Columbus. We selected Chicago because it is a large Midwestern reach city, and includes an advanced mobile application that makes transportation service more accessible to their customers. Amsterdam was also selected because they have an advanced and renowned public transportation system, and utilize a common payment system that is similar to what Columbus is looking to create. After developing the list of benchmark cities, we conducted interviews both over the phone and via-email with transit staff and officials in other cities.

Data collection and Analysis

Communicating with other cities about their kiosk design and trip-planning systems gave our team the information we needed to design a kiosk and planning system that caters to the needs of the Columbus area. The most intensive part of our research process was the interviewing process, as every city's transit system that we analyzed involves many different

stakeholders and partners. To ensure the reliability of our data, we made certain that we were contacting the correct governmental or state agency, and, the correct representative within that agency, whom are responsible for the programs that we were researching.

Benchmark and Interview Findings

Chicago, IL-- Ventra System

The city of Chicago utilizes the Ventra System. Ventra cards can be purchased from kiosks, vending machines, and retailers. The cost of the Ventra card is $5, which is returned as transit value upon registration. The user can add funds to the Ventra card through any debit card, credit card, cash, or any form of mobile banking. Users are able to check their balance at any Ventra Vending Machine. The Ventra System also offers Ventra Tickets, which are paper and contactless, allowing users to access public transit without creating an account (Chicago Transit System, 2018). These are available in kiosks, as seen in Appendix C, Figure 2- located at every station. In addition to this, there are disposable paper tickets that offer single-day and single-ride use. All forms can be used to board the CTA (Chicago Transit Authority), Metropolitan Rail, and the Pace (Suburban Bus). The Ventra System also offers reduced fares to eligible customers, including students, seniors, and people with disabilities. The system features a mobile phone application that pairs with the kiosk to load money and execute trips. The Ventra System is really well designed, efficient, and is constantly improving with time.

We interviewed Joseph Moriarty, The Principal Planner for the Regional Transportation Authority of Chicago (RTAC). Moriarty's key recommendations were to integrate kiosk ambassadors and mobile technology. Ambassadors are an important part of the kiosk integration process to help customers with purchasing or loading fares. When the common payment system is first initiated, the RTAC assembled a support team at major hubs to assist customers with the

transition, such as purchasing the common payment system card, loading purchases onto their card, and using the trip-planning application. Gaining insight into the Ventra system ambassadors program can help Columbus with implementing a similar program when the system is first initiated. Secondly, Moriarty believes that integrating mobile technology is a more affordable option, and would allow the city to reach readily available financial standards with more ease than a physical kiosk. While the current focus is a kiosk system, Columbus is also looking to develop a mobile application to complement the physical systems. Moriarty's advice suggests that Columbus should continue research into a mobile application, which can ease transportation access for city residents.

Seattle, WA-- ORCA Card

Seattle utilizes the ORCA Card. The card itself costs $5, and the user has the ability to add between $5 and $300 onto a card's E-purse. Customers also have the choice to purchase a monthly pass, and the price of the pass varies depending on the pass that you purchase. The ORCA card is all you need to pay your fare on Sound Transit, Community Transit, Everett Transit, King County Metro, Kitsap Transit, Pierce Transit, Seattle Street Car, the King County Water Taxi, and Washington State Ferries (ORCA, 2018). If an individual needs more than one bus or train to get to their destination, the ORCA Card automatically calculates the transfer. This is a very convenient feature for passengers who need multimodal transportation. A visual representation of this is seen in Appendix C, Figure 3.

To benchmark the city of Seattle, our team interviewed Mark Gloss, the FA III ORCA Operator in King County. Gloss' first recommendation was to integrate incentives for retailers. The ORCA system offers a 2% commission on sales to every retailer that will sell ORCA cards. Because Columbus wants to avoid cash transactions in their kiosks, a similar system of local

retailers and grocery stores selling ticket cards is a good fit for Columbus, and the incentives that the City of Seattle uses to engage and benefit their partners are instructive to future systems here. Regarding kiosk maintenance, Gloss recommended employing individual crews from each agency to provide maintenance and cleaning services at specific kiosk locations. Additionally, he recommended employing a security crew to ensure the kiosks are safe for all customers. This is a helpful insightful for the Linden area, because an overall objective is to ensure the safety of both Columbus residents, and the kiosk infrastructure. *(Please see Appendix B for interview responses).*

Amsterdam, The Netherlands-- OV Chip Card

Another system that may provide good models for Columbus is the OV Chip Card system in Amsterdam, the Netherlands. We were not able to interview staff associated with this system, but several features of this system are notable. Amsterdam utilizes the OV Chip Card (OV-Chipkaart). There are three different ways to utilize the card: personal, anonymous, and disposable. The personal option is the preferred option for residents of the area, and is associated with the rider's identity. For travelers who are not from the Netherlands, occasionally utilize public transportation, or don't wish to share personal information, there is an anonymous option. Lastly, there is a disposable and single use ticket option, and this is the best option for those who are tourists, don't reside in the area, or don't frequent public transportation options. The anonymous and personal use cards cost a non-refundable €7.50 and last up to five years. The kiosk design includes a trip planning option that allows the user to pay by the kilometer, and includes multiple methods of transportation (OV-Chipkaart, 2018). An image of the kiosk is provided in Appendix C, Figure 1.

Discussion and Recommendations

Our main recommendation to the City of Columbus is to implement a 'CBus Card.' This common payment system (CPS) card would be accessible via physical kiosks placed in strategic transit hubs previously proposed by the city of Columbus. This card would be capable of being purchased anonymously and used for multiple modes of transportation as with the ORCA (Seattle), Ventra (Chicago), and OV-Chipkaart (Amsterdam) card models in each of the benchmark cities. The cards in each city were initially introduced to residents and occasional travelers without taking away other ticket forms. We recommend that the CBus Card be introduced to the public with a formal implementation, then phasing out of legacy cards. This model was followed in Chicago: the Chicago Transit Authority (CTA) introduced the Ventra card and its infrastructure was placed on public transit payment turnstiles (Hilkevitch, 2013). Seattle had all seven of its transit agencies working on the ORCA card joint venture to implement it on all public transit routes (Gloss, 2018). To acclimate residents to respective common payment systems, Seattle and Chicago took different approaches. Seattle had a joint effort of its travel agencies to introduce the ORCA card; Chicago phased in the Chicago Transit Authority, then the Pace and Metra transit routes followed. We recommend that Columbus introduce the CBus Card onto COTA and CMAX, and then continue onto CoGo bike sharing.

We recommend outsourcing the common payment system to a company that has worked with large cities, such as Cubic Transportation Systems. Then when implementing the CPS in Columbus, a mix of COTA and developer ambassadors should be present at the kiosks to assist residents. The Ventra system was outsourced to Cubic Transportation Systems, which is also the vendor for the Transport for London: Oyster system (Bhattacharyya, 2017). During initial introduction of the Ventra system ambassadors from the CTA and Cubic were located near

Ventra Vending Machines (VVMs) that were located in transit hub station entrances (Moriarty, 2018). To increase ORCA card usage, Seattle created ORCA To-Go events that would target areas of low ridership where they would give residents free cards and help them load money into their rider E-purse (Gloss, 2018).

The purchase of the CBus Card would give a rider access to the multi-modal use benefits of the common payment system as well as a simple way to keep track of rider balance and ease of adding value or ride passes to the card dependent on the desired travel distance or time used. Initial purchase of the common payment system card would be a sunk cost, unless the card is registered to a rider, and the cost would be added to an E-purse value. The card would act as a transportation debit account where riders can add money or passes that are accepted on all modes of transportation.

Given the preference that transit stop kiosks not accept cash, we recommend the City of Columbus partner with third party vendors (such as Kroger, CVS, local markets, etc.) to install kiosks at contracted and licensed vendors to dispense a CBus Card via vendors/kiosks that can accept cash. These vendors should be located near Columbus residents that do utilize cash, like in Linden, and within walking distance of major transit hubs like Northern Lights. These vendors would have contracts with COTA, or the city of Columbus, and share a percentage of the kiosks' profits. Each of the seven transit agencies in Seattle created their own contracts with third party vendors that are licensed to sell ORCA cards, with retailers earning 2% profit on the sales of ORCA cards (Gloss, 2018).

Another important step in a common payment system is to create a kiosk that can dispense new (tickets or cards) or add value to existing cards. The kiosk design we recommend would accept credit or debit cards only (*see appx D*). The kiosk should be able to check a CBus

Card's balance, rides available, and past rides. These operations can be made available by to each card having a unique serial number assigned to it that tracks the card from kiosk to tapping on and tapping off transit (ORCA, 2018). The kiosk should also be able to dispense disposable tickets for non-residents or one-time riders. Our recommended design and physical placement of the kiosk is based upon user interface design studies that focus on user-centric designs, as well as making the interface alluring to the user. A touch screen should be in the middle of the machine but to the left of the other options, because when eye movement is tracked on a screen a user is more likely to look to the upper left corner (Wang, 2017). Due to the need for user privacy, the keypad to input sensitive data would be to the right of the touchscreen with a mini roof over it, with the debit/credit card reader underneath it. The CBus Card reader and ticket/receipt/CBus Card dispenser should be under the touch screen and keypad. This design models the OV-Chipkaart kiosk design in Amsterdam and prioritizes the functions of the kiosk, which is important in user interface design (Wang, 2017). Our electronic hardware recommendation is to model the trip planner after Amsterdam's public transportation and incorporate Google Maps into the interface. This means a rider picks their destination and preferred transit method, and then the kiosk will produce times and transportation info (bus notation, route, distance, time, etc.) for the rider. The display will then produce the price along with payment options. The CBus Card could pay via 'E-Purse' or by its hourly/number of rides allotted to the rider's card.

We recommend creating a mobile application that integrates the public transportation routes with the common payment system card (CBus Card). This will immediately remove the need for physical kiosks which are bulky, costly, and have maintenance and perpetual contracts with vendors (Moriarty, 2018). Moving to a mobile application would likely be less costly for the city of Columbus, and opens up features that can be accomplished through an application

including: mobile ticket, find nearest bus stops, plan a trip at the touch of your fingers, access rider history, and apply for low income fares via the application. According to the Linden survey, 93% of participants had smartphones, with 88% having a phone plan (Smart Columbus, 2017). This shows that areas of lower socioeconomic status can access this technology and once the City of Columbus can produce this infrastructure, the population will be capable of adopting it *(please see Appendix D for design).*

Limitations

The limitations of this project include our limited professional expertise on kiosk design, acquiring proper contact information in each benchmark city, and the time limit for the project. These limitations each created barriers that were anticipated at the beginning of this project, some of which were more of a concern as the project came to a close.

Our professional expertise caused a barrier because our team was not able to speak about payment systems from a technical standpoint, and we knew little about kiosk design elements like computer systems and prompting or physical hardware. Nonetheless, we did our best to translate what we learned into design recommendations.

The job titles of our interview subjects varied for each benchmark city, there were also many employees who would not respond to email or phone calls, so we had to extend out searching. Each city has a regional governing agency superseding smaller transit authorities. This made it difficult to narrow down which agency should be contacted to acquire information, and who would be knowledgeable within the agency of the city's kiosks and common payment system.

We had only a semester to tackle these questions, but this process, as acknowledged by Chicago representative Joseph Moriarty, is a marathon not a sprint, and it is important to do

thorough research of any desired system. This means looking at contractors to create a common payment system, consulting firms to assist with the transition to the new system, having more surveys completed within the city to learn what will assist the current population, and setting up proactive programs to educate the public on these new systems.

Conclusion

In an effort to design a Common Payment System for the city of Columbus, our group thoroughly researched existing transit and kiosk systems from various cities that had advanced transit systems, while also sharing similar demographics with Columbus. We conducted research and interviews with transit authorities from Seattle, Chicago and Amsterdam. The information that we were able to collect aided us in designing a common payment system that fits the needs and wants of Columbus with particular attention to disadvantaged areas. Moving forward, execution of a common payment system and kiosk design for the City of Columbus will require more information and research, particularly ergonomic studies regarding the strategic placement of kiosk features, and their user interface design. Creating a successful multi-modal transit system in the City of Columbus will require thorough security measures, the creation of a mobile application, and ensuring the correct ride purchases (E-Purse, ride allotments, etc.) are implemented into the kiosk interface that best suit the city of Columbus. With this project, we have created a framework for the City of Columbus as well as established contacts within cities that can be valuable to Smart Columbus employees moving forward. We hope the city of Columbus is able to pair a common payment system with the many transit modes in Columbus that is most advantageous to current and future residents.

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Appendices

Appendix A. Linden Survey Results, C / O SMRT Columbus.

Linden Community Plan meetings - user engagement

City of Columbus staff recently participated in the following meetings to seek input and user needs from the Linden community on Smart Mobility Hubs and the MMTPA/CPS:

- Linden Community Plan Transportation Working Group (11/30/2017)
- Linden Community Master Plan open houses (12/7/2017 & 12/9/2017)

Attendees were asked if they were familiar with Smart Columbus, and whether they thought it was a good idea. Then, a brief description of the project concept was provided, accompanied by handouts and display boards that helped the participants understand the concept.

After each project was described, the attendee was asked to complete questionnaires to identify gaps and/or risks that we may not yet have considered.

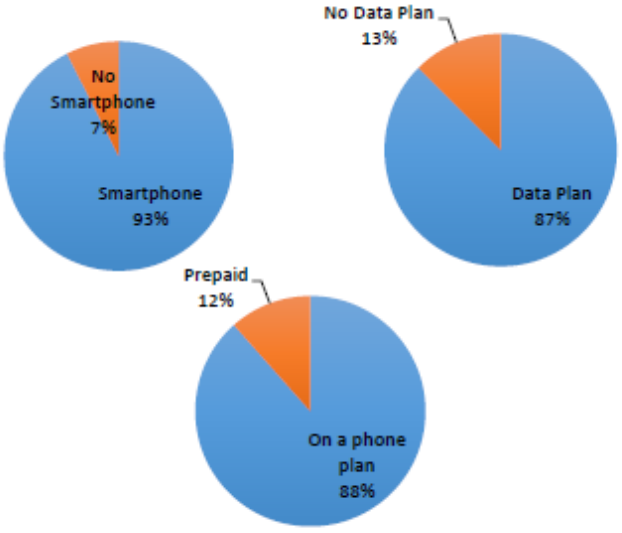
The feedback received from attendees is summarized below.

Multi-Modal Trip Planning/ Common Payment App (MMTPA/CPS)
Twenty-seven participants completed surveys and provided feedback on the MMTPA/CPS.

The city asked questions regarding cell phone use, which included:

- Do you have a cellphone?
- If yes, is it a smartphone?
- If yes, is it a prepaid phone or a phone on a plan?
- If yes, do you have a data plan?
- If you were making plans for getting around, how would you be most likely to pay for that travel?

Every participant had a cellphone. The results of the other questions are as follows:



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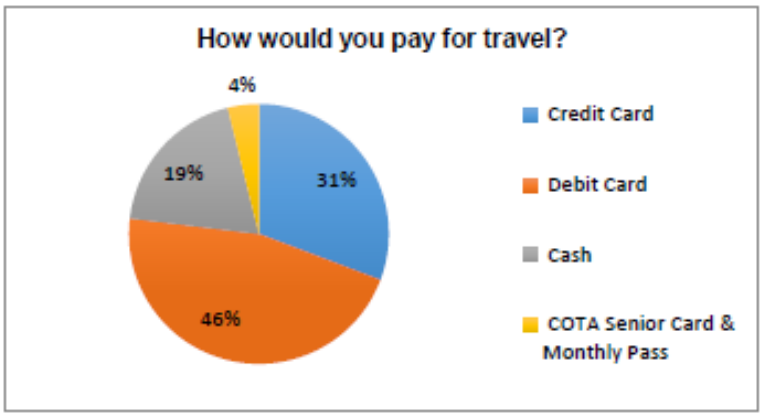
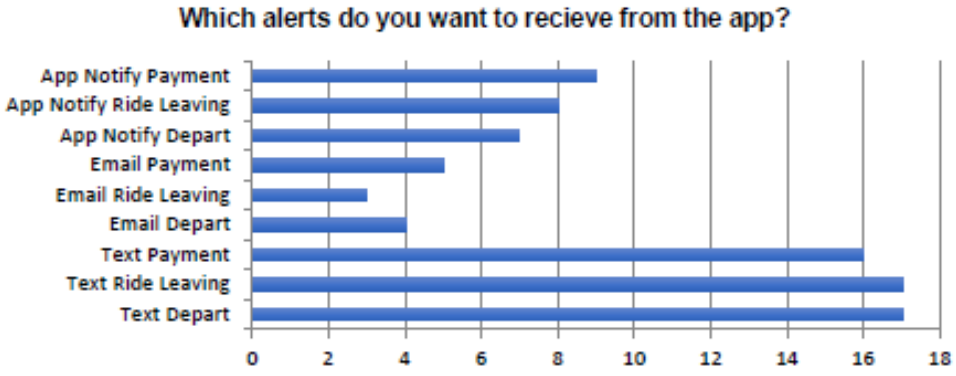


Participants were also asked to provide feedback regarding what notifications/alerts should be received from the MMTPA/CPS:

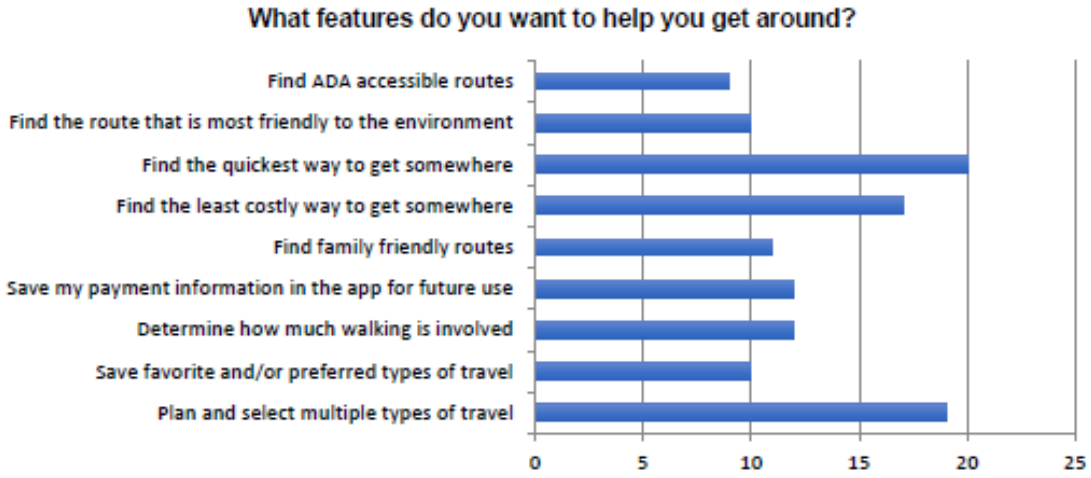
- Texts to alert me when I should depart my current location in order to get where I want to go
- Texts to alert me when my ride is on its way
- Texts to confirm my payment
- Emails to alert me when I should depart my current location in order to get where I want to go
- Emails to alert me when my ride is on its way
- Emails to confirm my payment
- An automated alert from the app when I should depart my current location in order to get where I want to go
- An automated alert from the app when my ride is on its way
- An automated alert from the app to confirm my payment



P 2

In addition, participants were also asked to provide feedback on what preferences/attributes should be included in the MMTPA/CPS and if there were any preferences that have been missed.

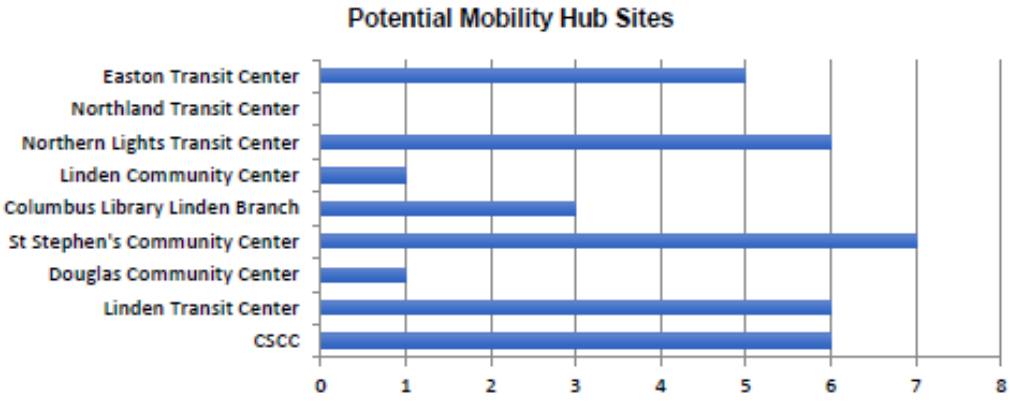
- Plan and select multiple types of travel
- Save favorite and/or preferred types of travel
- Determine how much walking is involved
- Save my payment information in the app for future use
- Find family friendly routes
- Find the least costly way to get somewhere
- Find the quickest way to get somewhere
- Find the route that is most friendly to the environment
- Find ADA accessible routes

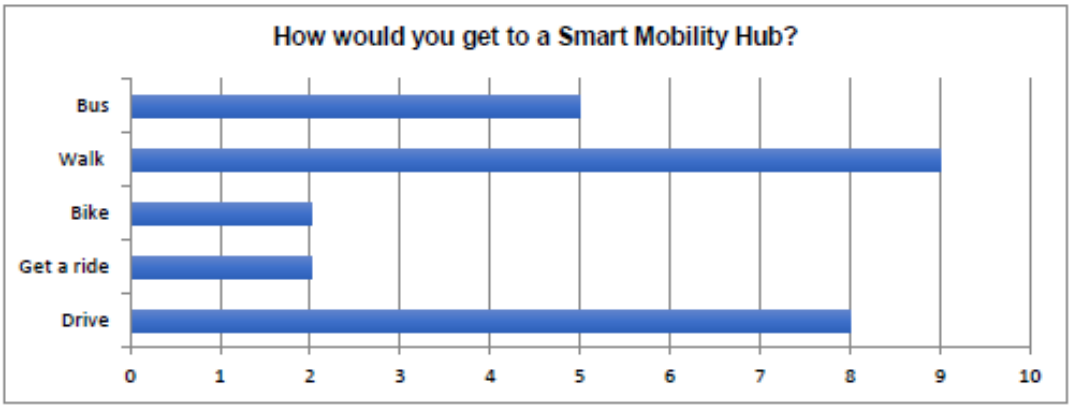


General feedback expressed great excitement the need for the project to happen quickly. One resident stated that he does not own a car and this application would help him make his travel decisions. Several residents stated that the ability to pay for all modes of transportation on one application would make life much easier.

Smart Mobility Hubs and Travel Kiosks
Residents provided input on the Smart Mobility Hubs and kiosks. Overall, the residents were interested in the multi-modal hubs. Many said they would use it. Some commented they'd see this bringing people into the community in addition to helping them to travel outside or around the community.

Participants were asked to provide input on where Smart Mobility Hubs should be located and how they would access the hubs.





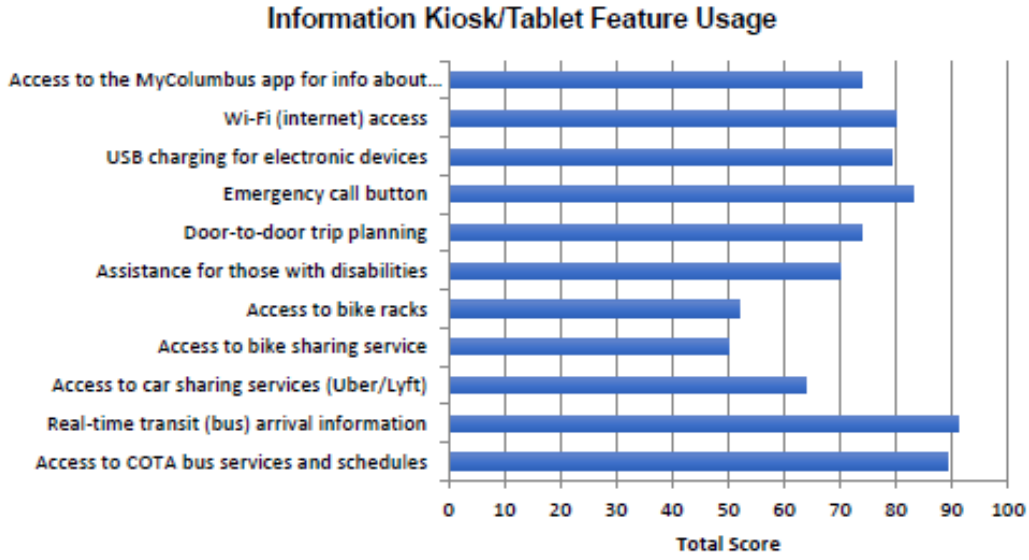
In discussions with the Linden residents, several explained the importance of St. Stephen's Community Center as a Smart Mobility Hub. There are several community activities and services at the center and residents expressed the importance of getting transportation to and from St. Stephens.

P 4

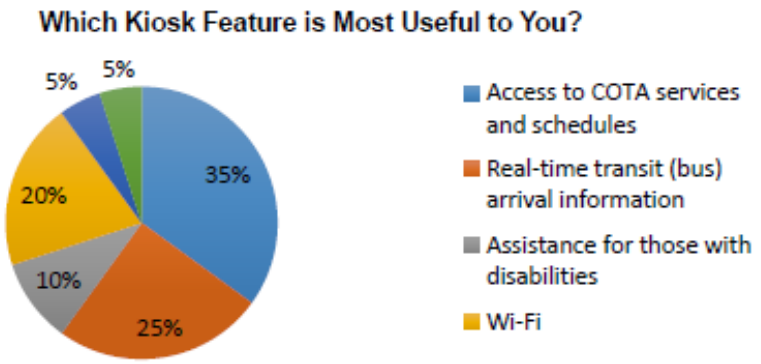
Kiosks will be located at the Smart Mobility Hubs to assist with travel planning. Linden residents were asked the following questions:

- If you were using a free standing information kiosk or mounted information tablet, how likely would you be to use each of the following features?
  - Access to COTA bus services and schedules
  - Real-time transit (bus) arrival information
  - Access to ride sharing services (Uber/Lyft)
  - Access to bike sharing service
  - Access to bike racks
  - Assistance for those with disabilities
  - Door-to-door trip planning
  - Emergency call button
  - USB charging for electronic devices
  - Wi-Fi (internet) access
  - Access to the MyColumbus app for info about Columbus services
  - Other?

Each participant scored the features on a scale of 1 to 5, with five being the most likely. The results were as follows:



Participants were also asked which kiosk feature would be most useful to them. The results are as follows:



Appendix B. Research Interview Responses.

Interview Questions: Joseph Moriarty, Principal Planner Regional Transportation Authority Chicago, IL

1. Were there experts/Ventra ambassadors at kiosks dispensing the Ventra card to assist travelers in the transition to the new open-fare system? Or any information sessions to help transition low-rider turnout in areas of Chicago.

Response: Yes, I recollect that for a period of time there were personnel assigned to transition to the new Ventra system. I believe during this transition these "ambassadors" were a combination of Cubic Transportation Systems (the vendor) and CTA staff. Please note that each CTA station is also staffed by Customer Assistance (CA's) who also assist customers regarding purchasing and/or loading fares at the Ventra Vending Machines (VVM's) among other duties. CTA has over 140 rapid transit stations, usually there are two VVM's per station entrance (and sometimes more arrayed in clusters). Stations can have multiple entrances and exits.

2. When implementing the trip planner/multi-modal transit options into your kiosk/application hardware, what contractors did you use and how helpful were they in assisting the city in rider/resident implementation?

Response: If you mean the Ventra Mobile application, this application was developed by GlobeSherpa (since bought out by Moovel). I recall that there was (and continues to be) a media campaign regarding the Ventra Mobile application.

3. How are partnerships created and maintained with the retailers which sell Ventra cards in the Chicago area? What incentives do these partnerships entail for both the city, and the retailer?

Response: There are nearly 1,300 Ventra Retail Locations in and around Chicago, including most major drugstores and Currency Exchanges. You will have to talk to the CTA about partnerships and incentives.

4. What government agency barriers did you face with the implementation of multi-modal trip planning and kiosk placement? i.e., were there budget or cross-department challenges that had to be overcome?

Response: CTA was the leader in implementing Ventra. Certain CTA fare products are interoperable with Pace (Suburban Bus). If memory serves me the mobile application (mostly useful for Metra Customers) was implemented in 2015. The Ventra system was launched in 2013-2014. You may want to talk to CTA and Metra regarding your last question.

5. Do the public transit kiosks, that dispense the Ventra cards, have Wi-Fi capability for riders using that transit hub?

Response: No, I don't think they do. CTA stations typically have cell phone service. Some Metra trains and Pace buses are Wi-Fi enabled.

6. Who, or what city agency, maintains the kiosks that dispense the Ventra travel cards? Is this split among CTA, Pace, and Metra?

Response: The CTA has the primary responsibility for maintaining the Ventra machines. I believe some of the maintenance function is borne by Cubic Transportation Systems as part of the Design Build Maintain contract that CTA has with Cubic.

7. Does the travel planner on the application consistently prioritize low cost routes when creating a travel route, or shortest amount of time?

Response: The Ventra App has a real-time travel tracker, which identifies the next train (by station) or next bus (by bus stop). Not really a travel planner.

8. What was the most difficult hurdle in implementing the Ventra system/Ventra application from the Chicago Card and disposable tickets?

Response: Transitioning to the "open payment" concept, from the value of the fare "loaded" on a card and read at the turnstile/farebox, to an account-based transactional process. Initially some issues regarding "tapping on," causing delays in boarding. CTA/Cubic seemed to have solved this problem (mostly). If I recall the standard is 500 milliseconds, between the "tap" and "go". Impressive since the system is reading the card, polling the customer's account and providing a response all within a half second or so.

9. If there are any other hurdles, or advice you would give to a growing city, like Columbus, that wants to implement a common payment system to public transit, what would this advice be?

Response: Do your homework. Research London's system. Steer clear of closed "one-off" proprietary systems. The beauty of the open payment system is that it is built on readily available financial standards and technology. I would suggest looking into the Smart Card Alliance for more information. I would also avoid physical kiosks (costly). I think you can do a lot more with cheaper smart phone/mobile payments technology.

Responses via phone & email; April 10-11, 2018

Phone Interview Response: Mark Gloss, FA III ORCA Operations at King County

1. When first implementing your kiosks/trip planner with the ORCA card did you have city 'travel experts' nearby to help riders with using the technology or was there high use of the ORCA To-Go information session option?

2. What government agency barriers have you faced with implementation of multi-modal trip planning and kiosk placement? Such as cross departmental challenges, multiple stakeholders, budget issues, etc.

3. Is there a smartphone application associated with your city travel card and can it help with payment options for personal travel cards?

4. When picking a destination station within a group then choosing the ORCA card as payment, is there a directive to add money to your ORCA card if the e-purse balance is too low when choosing a rider's travel option?

5. Is there a travel planning system online/kiosk when creating a travel route to desired destination that includes the bus, ferry, and train system? If there is a multi-modal trip planner, when implementing into online/kiosk hardware what mapping application did you want to model it after, example: Google Maps, Apple Maps.

6. Who, or what city agency, maintains the kiosks that dispense travel cards? Is this left up to each transit system, such as Pierce, Sound, King County, etc.

7. What incentives were given to third party retailers for ORCA cards.

Responses via phone April 10, 2018:

- April 2009 brought ORCA online nothing prior all 7 transit agencies that participated
- Not sure ambassadors, probably did for tapping to get on the bus or ride centers
- King county found it more helpful (Orca to go sessions) than other agencies (targeted areas, senior centers or community events)
- If ridership is low hand out free cards but load value on their own
- Contractual agreements, retailers get 2% commission on sales, order cards distribute to them buy card then load from there
- Agents assigned to handle those specific contracts (1 agency handles contracts in that area with a 'safeway')
- No prompting on kiosk, it will automatically believe you're going to kiosk to load your orca card
- Trip planner app/online will assist, kiosk no interactive trip planning (prompting)
- Application has trip planning, auto load to add value, set up account
- Business passport revenue is highest per quarter, tvm (kiosk) growing faster than walk in sales
- Individual crews per agency go out and service and clean
- Stores data and its segregated, security people for King county or agency handles that side

Appendix C. Research City Kiosk/Card Designs.

Figure 1. Amsterdam OV-Chipkaart kiosk.

Figure 2. Chicago Ventra Kiosk.

Figure 3. Seattle Orca Card.

Appendix D. Recommendation Kiosk Design.

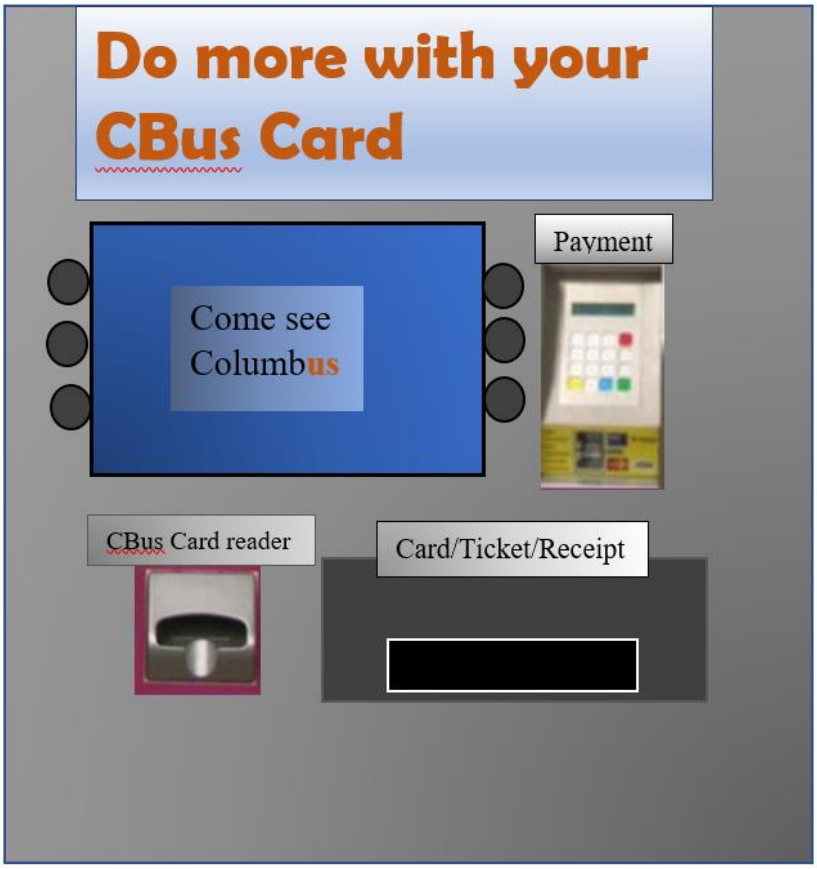


Figure 4. Mock kiosk design created by group.