User Research Report
SI 350: Water Rates Group 1
5/25/18

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PROBLEM STATEMENT

"The City of Ann Arbor is constantly seeking input from the community on new developments, policies, and programs. For example, the City is preparing to adjust rates for water, which will generate a lot of questions, suggestions, and concern from the community. How might a tool like Siri add value to the public engagement process around big community changes?"
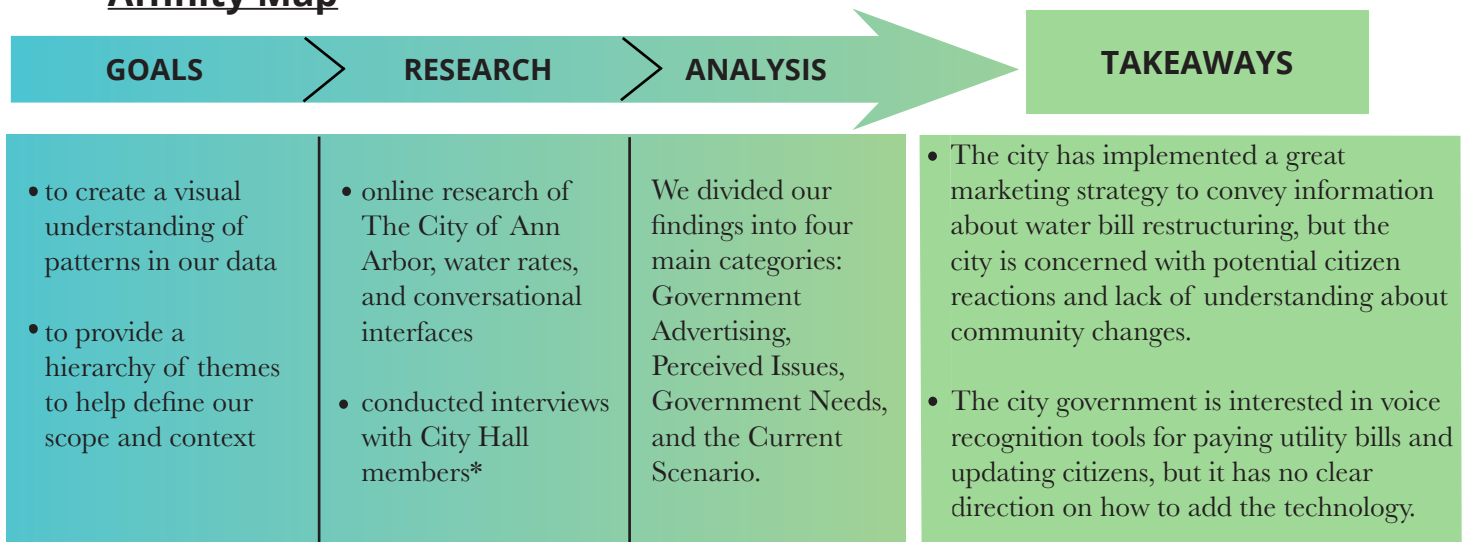
ABSTRACT

The goals of our research include acknowledging user motivations for public engagement, understanding user interactions with water consumption, identifying user Needs and Goals for water bill payment, and recognizing user attitudes towards voice interaction technology. After interviewing our city partners and analyzing survey and interview data from Ann Arbor citizens, we made connections between our findings to create affinity maps, a comparative analysis, personas, and scenarios. Our recommendation includes a short term goal of utilizing voice interaction technology for city updates and water consumption inquiries and a long term goal of incorporating bill payment through VIT as a commonality among Ann Arbor residents.
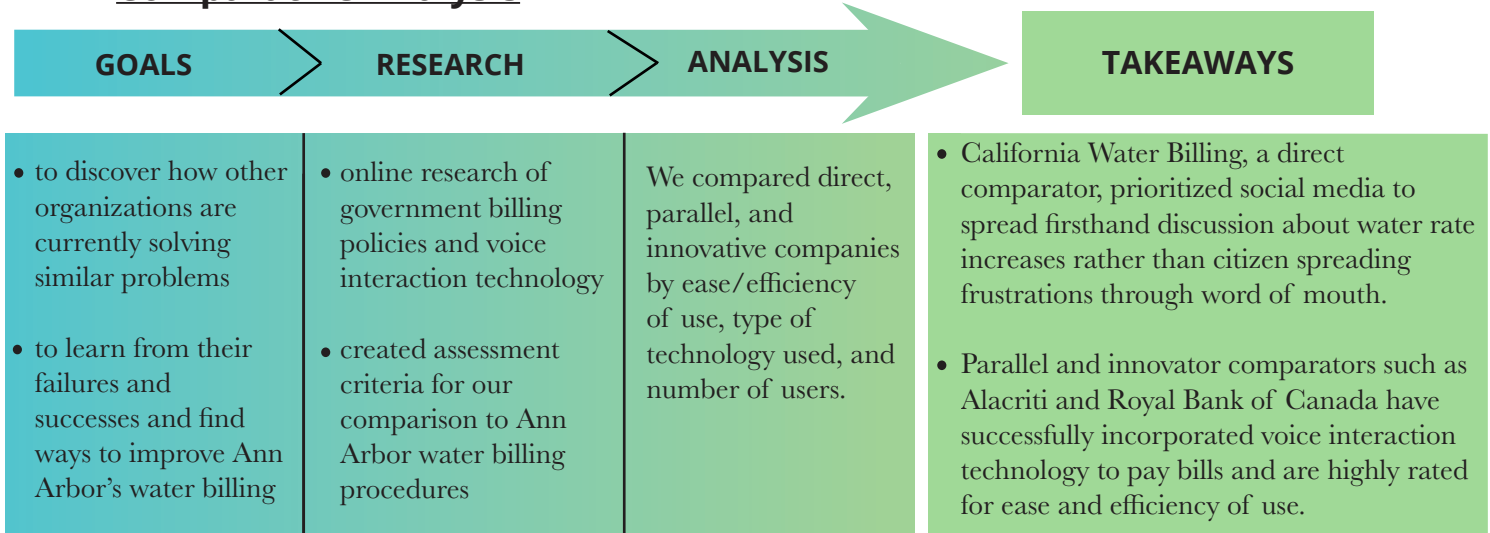
PROJECT SCOPING/CONTEXT METHODS AND FINDINGS

When determining the scope and context of our problem statement, our team decided to use the Affinity Mapping [appendix figure 1] and Comparative Analysis [appendix figure 2] approaches. Our project and scope will be defined after the analysis from user research.

Affinity Map

GOALS	RESEARCH	ANALYSIS	TAKEAWAYS
• to create a visual understanding of patterns in our data • to provide a hierarchy of themes to help define our scope and context	• online research of The City of Ann Arbor, water rates, and conversational interfaces • conducted interviews with City Hall members*	We divided our findings into four main categories: Government Advertising, Perceived Issues, Government Needs, and the Current Scenario.	• The city has implemented a great marketing strategy to convey information about water bill restructuring, but the city is concerned with potential citizen reactions and lack of understanding about community changes. • The city government is interested in voice recognition tools for paying utility bills and updating citizens, but it has no clear direction on how to add the technology.

*These interviews were conducted before our user interviews

Comparative Analysis

GOALS	RESEARCH	ANALYSIS	TAKEAWAYS
• to discover how other organizations are currently solving similar problems • to learn from their failures and successes and find ways to improve Ann Arbor's water billing	• online research of government billing policies and voice interaction technology • created assessment criteria for our comparison to Ann Arbor water billing procedures	We compared direct, parallel, and innovative companies by ease/efficiency of use, type of technology used, and number of users.	• California Water Billing, a direct comparator, prioritized social media to spread firsthand discussion about water rate increases rather than citizen spreading frustrations through word of mouth. • Parallel and innovator comparators such as Alacriti and Royal Bank of Canada have successfully incorporated voice interaction technology to pay bills and are highly rated for ease and efficiency of use.

RESEARCH GOALS FOR USER RESEARCH

Acknowledge User Motivations for Public Engagement

Because of Ann Arbor's diverse community, we strive to illustrate multiple perspectives of citizen engagement by understanding how people acquire knowledge about the community and to show awareness of individual identities. How will defining reasons for public engagement allow us to improve our recommendation?

Understand User Interaction with Water Consumption

Inquiring about how Ann Arbor citizens recognize their water usage will allow us to pinpoint areas of development for a better recommendation addressing our problem statement. How will people's knowledge and preferences of finding out their water consumption shape our end result?

Identify User Needs and Goals for Water Bill Payment

In regards to our problem statement, we want to evaluate how Ann Arbor citizens pay their utility bills, specifically their water bill, and how people would react to big community changes in the billing process and rates. When The City of Ann Arbor implements a tier-based water rate system, how will the citizens react and what do citizens wish for when paying bills?

Recognize User Attitudes Towards Voice Interaction Technology

While City Hall is interested in the implementation of conversational interfaces, we want to uncover how citizens of Ann Arbor would feel about these interfaces and identify their pains and gains from using civic technology. Can we make connections between these attitudes to provide a proposal that supports both the users and the partner?

RESEARCH METHODS AND DATA COLLECTED

Quantitative and qualitative data needed to be gathered to begin to answer questions related to our research goals. An online survey was administered to collect analytical data about our users. Interviews were conducted to understand the user's attitudes and experiences with voice interface technology (VIT) and public engagement with the city.

Survey

We designed our online survey [appendix figure 3] to answer questions related to our problem statement and research goals. Having a complete idea of a typical user of VIT narrowed the scope of our problem statement even more because possible personas emerged through our targeted questions related to our research goals.
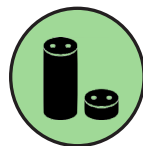
Information We Gathered

| Age | Housing Status | Bill Payment Preference | Use of VIT | VIT Concerns | VIT to Pay Bills |

Findings

The most impactful finding from this survey was that from these written responses a split in favorable and unfavorable opinions about VIT could be observed. While many responses cited that VIT was not a trustworthy way to handle the bill paying process, we also received some responses that were more positive and shared that VIT would make paying bills more convenient. Further, by asking citizens who took the survey to report their age range, it became apparent that user attitude and motivations were dependent on age. Specifically, we found out that young people used VIT at a more frequent rate and were more likely to use it to pay their bills than older citizens.

Interviews

Interview questions for the residents of Ann Arbor were created [appendix figure 4] to record the feelings and stories potential users had to share about VIT and their public engagement experiences with the city. We also interviewed Lynne Chaimowitz during this time to touch base on her interactions with other citizens.

Information We Gathered

Bill Payment Method

Public Engagement

VIT Experience

Water Use Knowledge

Findings

Generally, users pay their utility bills online or it is included in their rent. Some users shared that their access to information regarding their bills is restricted by their landlord, who receives information from the city and often doesn't relate it back to them. Another important finding that emerged from our user interviews is when participants were asked about their attitudes towards VIT, the responses were varied. We found that most responders have had good experiences using Siri and Alexa for asking questions, but are adverse to paying bills through those technologies due to accuracy issues.

From Lynne's frame of reference, users are concerned not only with bill paying, but general questions about their utilities and reconciling any problems they may have with them. Specifically, Lynne anticipates users will want "tangible quick tips" and the ability to calculate their water consumption.

IMPORTANT STATISTICS AND QUOTES

37%* of citizens are neutral, likely, or extremely likely to use V.I.T. to pay bills

61%* of citizens are responsible for paying their water bills

*Out of 60 survey Respondents

"Important information from the city I feel like I don't receive a lot because I'm a renter and live in a duplex so a lot of times that information goes to my landlord or my neighbor."

"I've used Alexa and Siri, I think they are helpful. I think if I had an Alexa I would pay bills with it."

"Paying my utility bill has been relatively easy, I just wish I got updates more frequently."

ANALYSIS OF DATA AND METHODS USED

Affinity Mapping

Given the helpful analysis we found using affinity mapping in our first week, we used this tool again to be able to compare and contrast findings found from the data our partner and the users provided. Using the information from surveys and interviews, we split it into individual snippets that communicated what we had heard from users [appendix figure 5]. We are now looking more closely at the divide in age demographics as we found younger people (18-35) were more open to the idea of using Alexa to pay a water bill, and older people (55+) were more apprehensive to the idea.

AGE DEMOGRAPHICS

A younger age group is more likely to use VIT shifts audience

Another theme that emerged from speaking with some users is the ways that people actually use VIT. For the most part, people said that they use it to call or text people, learn about widespread news, and to ask basic questions. We found that 34% of our surveyed participants use voice interface technology (VIT) daily, but found that none of our participants have ever paid a bill using Alexa before. This was something that came as a shock to us as we had heard from the city that they thought a lot of people used VIT to pay other bills. For the most part, VIT is used for basic tasks that can also be done on the internet or on a smartphone, but rarely used for something with sensitive information such as paying bills.

The third theme we discovered is that there is a continued need for public engagement. Almost half of our surveyed population get their updates from the city's social media pages, while less than 30% get their information from local news sources. We have found a vulnerable population in those that do not use these sources and are renters because the landlords control a lot of the information that is communicated to the renters. Oftentimes, the renters do not even see a water bill and just blindly pay whatever amount is added on to their rent.
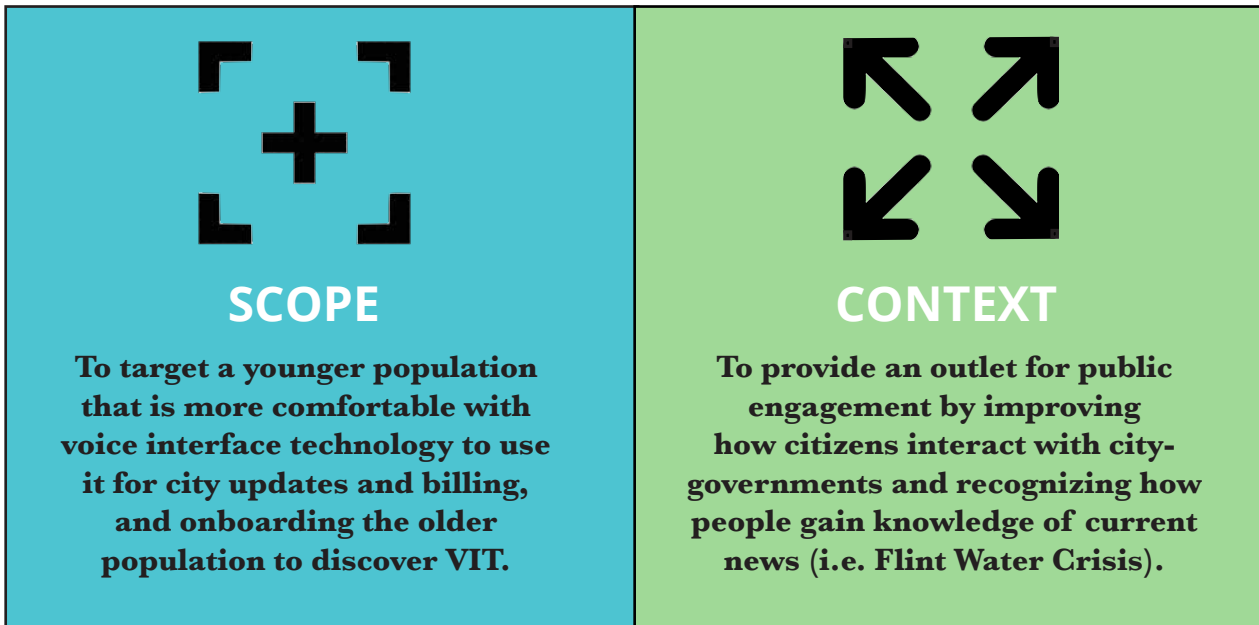
Personas and Scenario

Our team used Personas and Scenarios [appendix figures 6 and 7] to analyze the user groups we gathered from surveys and interviews. We applied and tailored this method to our problem statement by approaching the scenarios from two ways. One way was by splitting them into two main age demographic focuses, that being a younger generation (18-35) and an older generation (55+) and the other way we approached the scenarios was by applying different tasks that we would like Alexa to be able to communicate about the water bill, and even city updates.

Because of the general hesitation toward voice interface technology from most of the people we surveyed and interviewed, we created an older male persona, Frank Harris, that is involved with his Ann Arbor community and, ever since the Flint Water Crisis, he has become more environmentally conscious. This older generation that he represents to an extent is not as receptive to new technology, especially paying bills by talking to a small machine. One way that we want to reach this apprehensive population is by easing them into the process by having access to information about the city and other updates that they would find useful. Eventually, they might become comfortable enough with the technology to know how to pay their bill with it. We see this apprehension in Frank's scenario where he is overusing his sprinklers. If he had access to voice interface technology, he could ask how much water he has been using, and maybe even how he can cut back.
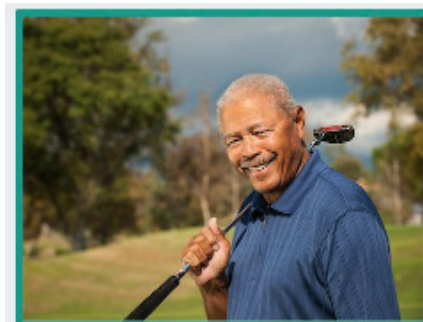
Our second persona is a younger grad school student, Carly Brown, who shares an apartment and is looking to cut costs. She represents a younger population that is open to the new technology and Carly finds the VIT helpful in her scenario to ask about a toilet leak. Alexa is able to communicate the measurements of how much water was leaked and also that the city will cover the cost, which Carly didn't know before. This tool helps her and her roommates cut costs and learn more about the city that they couldn't get before because their landlord limits the information they get, as do the majority of our survey respondents. While many in this age demographic use VIT for simple things like music and texting, some are open to using it to do things like pay bills. With voice interface technology access, these renters will have more access to information about their water usage, city updates, and tips on how to cut costs.

SCOPE AND CONTEXT OF THE PROBLEM STATEMENT

SCOPE	CONTEXT
To target a younger population that is more comfortable with voice interface technology to use it for city updates and billing, and onboarding the older population to discover VIT.	**To provide an outlet for public engagement by improving how citizens interact with city-governments and recognizing how people gain knowledge of current news (i.e. Flint Water Crisis).**

RECOMMENDATION

As we began to formulate themes amongst users, our prospective recommendations adapted to typical users' values, motivations, and concerns. The ultimate goal of the user is to pay their water bill most efficiently. However, many of our potential users are not yet comfortable with having their financial processes handled by Siri or Alexa. As shown in our findings, there is a general lack of trust due to perceived accuracy issues users that users have experienced with VIT. Therefore, our focus shifted to how we could most effectively capture user participation on a platform to grow into potential VIT bill payments. Noted from our conducted user interviews and surveys, only 43% of users pay their bill directly- via online, mailed, or by phone call [Appendix figure 1]. Consequently, it became our goal to propose recommendations that would make the most impact for Ann Arbor citizens. To best serve our users, our recommendations come in two parts-- short and long term. Our short term recommendation appeals to user's current comfortability with asking VIT questions. On the other hand, our long term recommendation appeals to how we perceive users will be interact with VIT in the future as adoption rates increase and doubts are dispelled by safety and accuracy developments.

Short Term: City Updates and Inquiry through VIT

Again, we found that users were not getting relevant information whether because of miscommunications of word of mouth or because they are renters and not privy to water bills and notices. Having a tool that allows users to ask questions right to their VIT devices will allow them direct access to accurate updates and news that they were not receiving before. Additionally, from our surveys we found that many users look to social media and the city website for city updates, and this information would be easily accessible with VIT.

Water Consumption Inquiries

Water meters at every house in Ann Arbor send data about each residents water consumption twice a day to a computer at City Hall. With this data and VIT, Ann Arbor can deliver answers to questions user's have about their water consumption trends. We envision that users could ask Alexa or Siri how much water they've used in a day the same way they would ask what the weather is. Our personas, Frank and Carly would benefit from this feature because it would save them money and conserve water. Frank would have a way to prevent any overuse that might occur from running his sprinkler in the summer, and Carly can be notified right away if a leak is detected. The entertainment value potential of this feature can be emphasized by the city. In a way, being able to constantly check water consumption may incentivize users to compete with other households to save the most water, and in turn, save themselves money. Lastly, being able to access this information allows renters to know exactly what they should be paying if they don't receive a physical bill rather than relying on blind trust that their landlord is charging them correctly.

Answer Questions & City Updates

To best aid users, this feature would also provide answers to general bill inquiries and other city updates that affect bill payment. This aligns with the analyzed context from our affinity maps that we gained from our interview with Lynne as well as user goals. Lynne suggested that being able to convey general bill inquiries to citizens would best aid our users' needs. This is further supported by the consistent findings from the survey and user interviews that even when people are not responsible for directly paying their water bill, they are still curious about their usage. Potential users were found to already be familiar with using VIT to ask questions or makes searches, so there is a higher likelihood they will elect to use these features. Because we anticipate that users will be using this feature frequently either to ask about their water consumption, or a bill inquiry, it is the ideal place to also communicate city updates.

Long Term: Bill Payments via VIT

The long term goal of our recommendation is to include water bill payments through VIT. We hope that the ease and entertainment users get from our short term goal will nudge them to consider paying bills this way. Although 0% of respondents reported using VIT for any sort of bill payments, 23% of all subjects reported being likely or extremely likely in adopting VIT for bill payments. It's important to remember that discomforted user groups responded that lack of trust is what drives their attitude towards VIT. However, as adoption rates for VIT pick up, and more developments are made in regards to accuracy and security, we predict increased rates of users using VIT to pay their bills. There are many benefits to this feature that users will soon understand as they become more comfortable with the technology. For example, since most users currently pay online, if they have a question about their bill they might need to open up different pages and tabs to find what they're looking for. With VIT, they could ask that question to Alexa or Siri and get accurate answers directly from city sources and then go on to pay their bill in only a couple sentences. This could be particularly helpful to an older user like Frank, who may not be experienced with web searches, but could easily voice their questions to a device. Another benefit for users is the reduction of processing fees and late fines that are characteristic of paying on the phone or through mail. Finally, the city can reap benefits from bill payment through VIT, paying through this tool would reduce the amount of human labor the city dedicates to processing mailed in bills or fielding general question calls from residents.

DISCUSSION ABOUT ASSUMPTIONS

Stemming from the persona and scenario analysis of our user interviews and surveys, our problem statement must be further scoped to accommodate the added context of potential users. Entering this week, our assumptions about users were:

- Users would be enthusiastic about VIT water bill payments
- Users want sustainable communication with city updates
- Different user groups would react differently based on consumption level

However, from the user surveys specifically, our findings showed that users do not fully trust VIT when asked what contributes to their likelihood of using Siri/Alexa tech to pay their bills. However, our assumption that citizens desire communication about city updates remained true. This was evident in our findings from our partner and user interviews; as mentioned previously, we found that 34% of citizens reported using VIT daily for quick news updates. Relating back to our target audiences, we expected different user groups to respond differently based on differing water consumption rates. For example, we assumed landlords and renters would be affected the most. Adversely, through our findings with our interviews with Lynne and then users, only 50% of citizens have water billing accounts to pay their bills and that most landlords include water bills in rental agreements. We found from our surveys and user interviews that user groups were distinguished mainly by generation- who is already using VIT, and who is open to it. By evaluating our assumptions, we were able to come up with the recommendation proposed above and create an information flow diagram [appendix figure 8].

APPENDIX

FIGURE 1: SCOPE/CONTEXT AFFINITY MAP

How the city gets information out			Perceived Issues		What They Want					Current Scenario	
Offline	Online	Future Marketing goals	From Users	From City Hall	Effective way to tell people about Tier Structure change	Who to target	Emerging technology			Infrastructure	Communication
Resident Newsletter	City website	Need bigger social media budget	people dont blindly trust their government	AA does not communicate enough	How can people ask questions?	reach out to renters	Siri	Alexa	A2 Fixit	AA puts chemicals in water to keep it clean	flint messed up the chemistry
Press releases	Email lists	Want bigger email list	people will feel like bill jumped for no reason	expect confusion, frustration, anger	Successful communication depends on topic	Large families will notice change most	siri to reduce processing costs	pay water bill with alexa	use A2Fixit	Old water pipes (120 years)	prefer people to call w/ water issues
Publications within city	Social Media	want to communicate with more citizens	No historical knowledge	Need to keep people happy	Successful communication for water is thru billing	hard to reach student residents	siri could help answer questions	report problems using alexa	shift how people view A2Fixit?	Law is main driver for system change	about to start $100 million reno
			new problems emerging =expensive	problem w/ information overload	want to communicate BEFORE bill comes		could siri respond with more info		interact with A2 Fixit to request service, perform task		

FIGURE 2: COMPARATIVE ANALYSIS CHART

COMPARATIVE RESEARCH & ANALYSIS CHART: Ann Arbor Water Billing

Comparators	Type of Comparator	Brief Description	Website URL or Location	Ease of Use Rated 1-5 1 very easy - 5 very difficult	Efficency of Use Rated 1-5 1 very fast - 5 very long	Technology Used	Avg. Review Score (if applicable)	App available?	Level of government	Population/Number of Users	Level of Customer Service Rated 1-5 1 very poor - 5 very good	Start date
Ann Arbor Water Billing	Partner	WaterMatters Newsletter	https://www.a2gov.org/	3	5	online bill pay, leak a	4	no	city	<120,000	5	July 1, 2018
CityInsight	Direct	Partnered with Amazon to allow Detroit Water and Sewerage Department (DWSD) customers to pay their bills with an Amazon Alexa command.	http://www.dbusiness.c	4	4	Amazon Alexa	n/a	yes	city	2 million (Detroit)	4	August 2017
Phillidelphia Water Billing	Direct	Implemented an income-based water billing	http://www.latimes.com	n/a	n/a	n/a	n/a	no	city	1.5 million	5	July 2017
State of California Water Billing	Direct	Due to drought, California had to change the way the state structured citizen's waters bills. California responded to the increase in water rates similarly to Ann Arbor by emphasizing that the increase in payment would lead to better maintenance of infrastructure. The general response of citizens to the increase seems to be confusion and frustration based on observing online comments from California citizens. The Los Angeles water department provides online water bill payment that the assessment criteria will be based on.	https://www.ladwp.com	3	3	Los Angeles Water &	n/a	no	State Level	4 million citizens in L.A	3	2013
Alacriti	Parallel	Financial services organization providing solutions to banking issues through technology. Participated in the PYMNTS.com Voice Challenge with Amazon Alexa and provided ways to incoporate voice interface technology to improve the paying process.	https://www.pymnts.cor	2	3	Amazon Alexa	n/a	yes	n/a	5 million	4	January, 2003
Amazon Pay	Parallel	Amazon is developing payment through third party voice recognition developers, which can extend to purchases on Amazon, and in-app purchases also	https://developer.amaz	4	4	Amazon Alexa, deve	4.7/5	yes	National consumers	310 million active users	4.5	Winter of 2017
DTE Online Payments	Parallel	DTE offers quick payments online once an account is set up	https://www.newlook.dt	4	5	online bill pay	4.5	yes	n/a	2.2 Million Customers (Southeastern Michiga	5	2017
Apple Pay	Innovators	Mobile payments service and digital wallet app that can be used to make secure payment transactions between contactless payment terminals	https://www.apple.com/	3	4	iPhone Siri	4.6	Yes	n/a	87 Million	4	October, 2014
Royal Bank of Canada	Innovators	First bank in Canada to link bill payments with Siri through conformations. Also allowing payment by iMessage.	https://www.mobilepay	5	5	RBC Billing and Siri	5	yes	National	<16 million total accounts	5	August, 2017
Venmo pay by Siri	Innovators	Using a specific format on the Venmo website, you can make payments through Siri directly.	https://help.venmo.com	5	5	Venmo payment serv	5	yes	n/a	7 million monthly active users	4	May 1, 2018

FIGURE 3: LINK TO SURVEY

FIGURE 4: INTERVIEW QUESTIONS

Are you a resident of Ann Arbor?
Are you responsible for paying the water bill in the household?
If not, have you seen the water bill before?
How do you currently pay your water bill?
How do you usually find out information about water billing and city updates?
How has your experience been paying your water bill?
Have you ever used voice interaction technology such as Amazon Alexa, Apple Siri, or Google Assistant?
If so, when do you use these technologies? How has your experience been using these technologies?

FIGURE 5: UX RESEARCH AFFINITY MAP
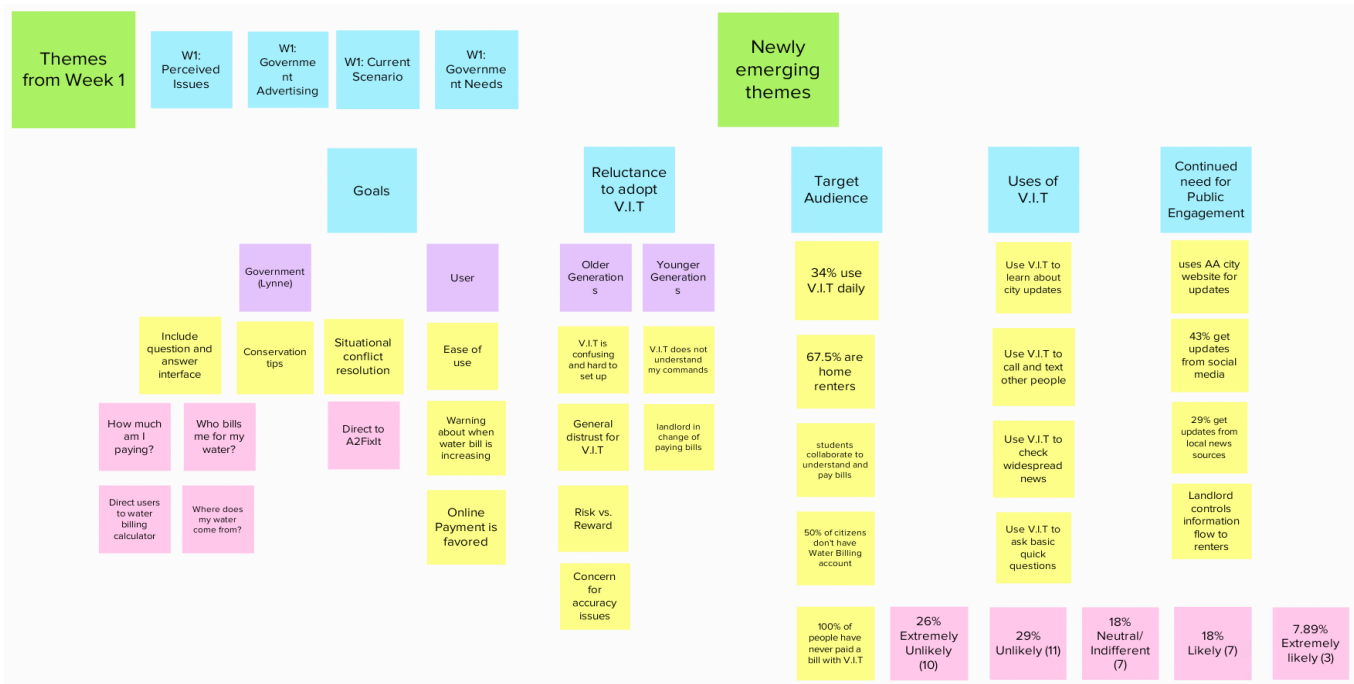
FIGURE 6: PERSONAS

Ann Arbor Resident for 40 years | 77 Years Old | Lives with Wife Barbara

Frank Harris
Anti-Persona
New Grandpa, Old Golfer

"I don't use voice interactions right now...There are already so many cool things I am missing out on. What's another one? :(:("

About Frank:
Frank Harris has lived in Ann Arbor more than half his life. As his now adult children were going through school, he and his wife Barbara were actively involved in their sports and academics. They often hosted neighborhood barbecues, family parties, and school events at their home. He loves being involved with his community and is passionate about knowing what's going on and how he can be a part of it. As a fun dad, fervent golfer, and regular neighborhood family man, Frank loves the outdoors and has been more environmentally conscious since the Flint Water Crisis, always keeping an eye on how much water he and Barbara are using. Frank will talk your ear off about golf and his brand new grandbaby, but has no interest in talking to Alexa.

Motivations:
- Actively improving Ann Arbor
- Protecting the environment by lowering water usage

Pain Points:
- No interest in the advancement of technology
- Pays bills by mail
- Doesn't get digital updates about water usage

Goals:
- Paying bills on time
- Accessibility to bill
- More knowledgeable about monthly water usage

Ann Arbor Resident for 2 years | 24 Years Old | Lives with 3 Roommates

Carly Brown
Fashion Blogger, Grad School Student

"I'm always looking for the newest tech to get things done. Using my Alexa to pay my water bill sounds fast, easy, and a win/win for me and the city!"

About Carly:
Carly Brown is a student in the Public Health Graduate School. While Carly is a full time student, she is also actively involved in the online fashion blogging industry. Carly bought an Alexa as soon as they were released and she and her roommates use it for things like Spotify, new recipes, updates about shopping packages and more. Carly rents an apartment in Ann Arbor and the flow of information from her landlord is limited, so she would love to know more about her water bill month-to-month. She and her roommates are also looking to cut costs, so conservation updates and tips would be helpful. With a tool like bill payments and updates with Alexa, Carly Brown would be passionate ambassador for voice payment!

Motivations:
- Being in the "know" about new technology
- Understanding billing process and water measurements better

Pain Points:
- Cost
- Communication with roommates
- Doesn't get a lot of information from landlord

Goals:
- Saving money
- Splitting costs evenly with roommates
- Helping others understand new tech

FIGURE 7: SCENARIOS

The Sprinkler Scenario

This summer, Frank and his wife Barbara's son came to visit them. He told them that their sprinkler system was running for too long and wasting a lot of water. This upset Frank because he is a big advocate for the environment and is always looking for new ways to be cut back on things like plastic, fossil fuels, and water usage. Frank's son told him that if Frank got an Alexa, he could hook it up to their water meter and it would be able to measure daily how much water they are using, and how much they could cut back. Frank, like many others his age, is hesitant about trying out new technology, especially something that seems so advanced like a voice interface technology system. After all, Frank still pays his water bill through the mail. While he and many of his friends are apprehensive about a tool like Alexa, Frank is interested in the way that it can help him track he and Barbara's water usage and how they can ask questions about city updates. He really doesn't want to abuse his access to water through his sprinkler system, so Frank is one step closer to being the newest user of Ann Arbor water bill payment through Alexa.

The Toilet Leak Scenario

Carly and her roommates woke up this morning and discovered their toilet leaking all over the bathroom. They quickly find a way to turn off the water, but are worried about how much was wasted, and how much it will cost them. Carly says, "Hey Alexa, how much water was used in the past 24 hours?" And Alexa responds with a much higher amount than they are used to. "This is more than usual." Alexa's analysis concludes. "How much will the water bill be for this month?" Carly asks and Alexa gives them an estimate. "Did you know that Ann Arbor city hall will cover the cost of the leak if you show them proof?" Alexa asks and Carly and her roommates are pleasantly surprised. They had no idea that service was available, and they were already thinking of ways to pay for it themselves. "Alexa, call City Hall," Carly says, and Alexa does as she is told. The city refers them to a plumber to fix the problem, and sets up the reimbursement for the leak. Carly and her roommates are so grateful for the water billing information and updates that Alexa was able to provide them.

FIGURE 8: INFORMATION FLOW DIAGRAM