

Touchless UX: Small Business use of QR Codes during the Covid-19 Pandemic

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<p>Due to the drastic effect of the Covid-19 pandemic on small, non-essential businesses in the United States, businesses in the restaurant and retail sector have had to adapt their services and offerings in order to keep up with strategy and meet customer needs. This study looks at the decision-making process and adoption of four businesses in Lexington, Ky to convert their high touchpoint activities into “touchless” digital solutions using QR codes.</p> <p>Research was conducted with two restaurant and two retail businesses with owners being interviewed as well as ethnographic research conducted to ensure observational validity. Insights into the deciding factors of why QR was chosen over other digital solutions, process of adopting QR code and the positives and friction points of this decision demonstrate the changes the businesses endured because of the pandemic.</p> <p>Results are shown with customer journey maps built off of mental models coded from interviews conducted by the author on the business owners, and supporting data was collected through 20 hours of ethnographic research and observation in each environment. Results were verified and reviewed by the participating businesses to ensure validity and reliability.</p> <p>This thesis concludes by stating that the motivating factors behind the decision to adapt services and other consumer actions to QR codes was customer engagement and safety of staff and customers. The cause of these factors was a decline in sales due in part to closure of “non-essential” businesses from March-May 2020, as well as restrictions on capacity and customer interaction by government mandate.</p> <p>The choice of QR code above other digital alternatives came as a result of cost-effectiveness, ease of recognition and use as well as meeting business goals of increasing safe and effective customer engagement.</p> <p>The study was conducted from September to November 2020 with the final report submitted November 2020.</p>	
Keywords QR code, Covid-19, business strategy, digital adoption	

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1 Introduction

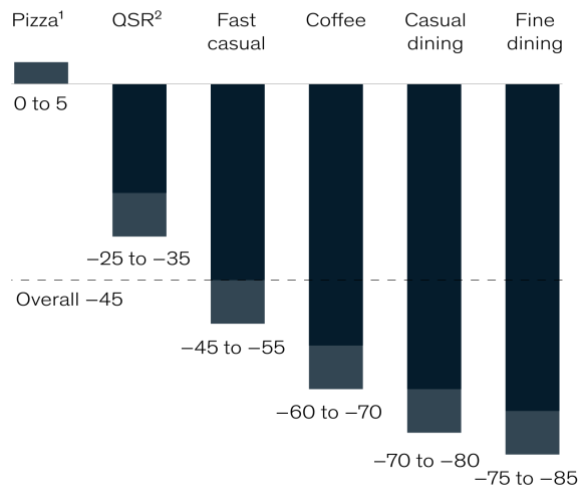
1.1 Background

The Covid-19 Pandemic in 2020 has transformed how businesses in the United States are interacting with their customer base to meet their needs. Through the increase of digital alternatives from classrooms to communication platforms that replace in-person interaction, touchless experiences are emerging to combat user fears and societal expectations. (Baig & Hall, Jenkins, Lamarre, McCarthy 2020). Because of this, physical touchpoints in businesses are changing to adapt to the global consciousness of hygiene, safety and social distancing guidelines in order to continue to offer products and services to their customer. (Bartik & Bertrand, Cullen, Glaeser, Luca, Stanton 2020).

One of the highest impacted business categories is restaurants or other sectors deemed “non-essential”. (Haas & Kuehl, Moran, Venkataraman. 2020.) Non-essential refers to the sectors of business not needed to sustain life and are sometimes referred to as “recreational businesses”. The determining factor of what was considered a “non-essential” business came from Homeland Security’s definition that a business is non-essential if it’s prevention of providing services and products does not interfere negatively with the country’s infrastructure. Examples include gyms, salons, spas, casinos, museums, malls and sporting venues and in most cases, restaurants and retail. (Jiang, 2020.) Figure 1 demonstrates the effect on sales that closures have had on businesses in the dining industry. Dining environments that are typically “in-person” took a drastic hit on sales while the only positive improvement was dining that has a “delivery” option. Figure 2 demonstrates the negative effect on in-person retail sales during the pandemic but also the rise in online commerce and grocery store profit.

The pandemic's impact has varied across restaurant types and subcategories.

US sales by restaurant type during COVID-19 crisis,
% change from 2019 as of April 17, 2020



¹Includes fast-food pizza only.
²Quick-service restaurant. Includes burger, chicken, Mexican, and sandwich; excludes coffee and pizza.
Source: Bernstein Research; Datassential; McKinsey research and analysis



Figure 1: Pandemic impact across restaurant types. April 2020. (Source: McKinsey & Company)

Retailers suffer record plunge in sales in March
But some stores such as grocers and Internet retailers see surge

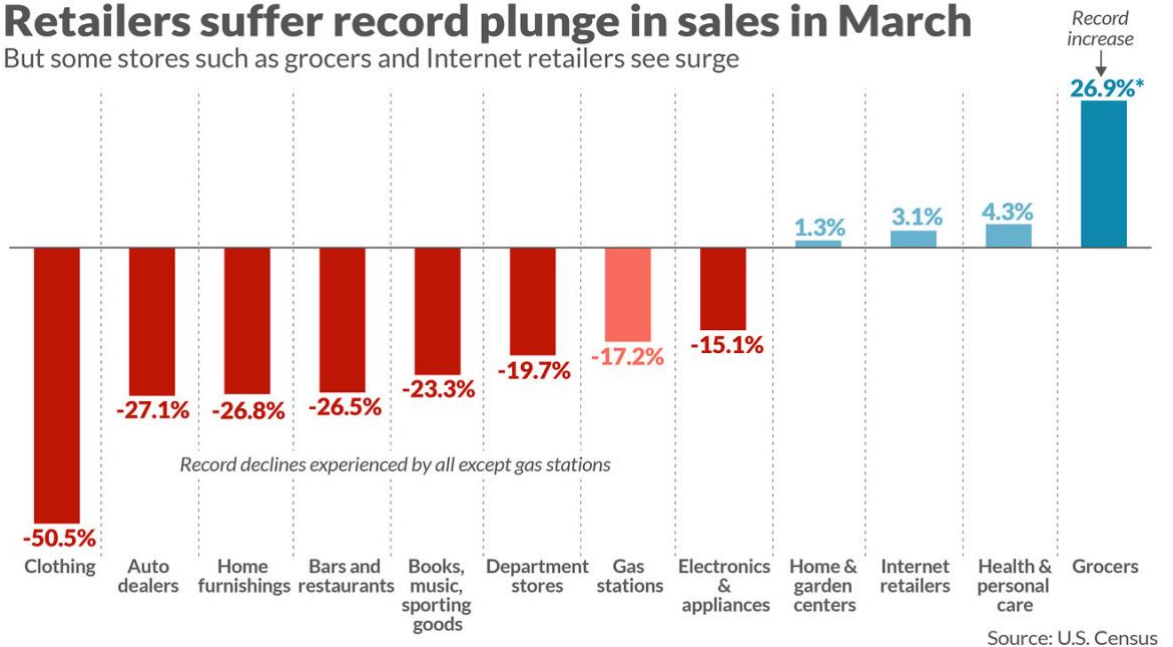


Figure 2: Pandemic impact on retail segments. March 2020. (Source: Market Watch)

There is an increase in research and design efforts that change how businesses interact with their customers during these times while continuing to provide the same services offered pre-pandemic. This thesis will go into this business change and the user experiences and developments that have and are currently a result of these changes. Focusing on the adoption of the connection method- QR Codes, this thesis aims to understand how businesses are adapting their environments using this tool to maintain societal restrictions during the pandemic in order to continue to meet customer expectations. The outcome is a better understanding of the new "touchless" digital experience that QR Codes offer and the situations where their adoption has benefited or caused pain points to the business.

There are a lot of scholarly articles and technical definitions of QR codes available as a research resource since their inception in 1994. Since then, their use cases have spread throughout many industries and their design and social adoption rate has increased. (Shin & Jung, Chang. 2012). On the other hand, the research pertaining to QR codes during the pandemic might be more of a challenge on account of the fact that we are still seeing developments and changes in businesses using these codes while social constraints are still in place. Because of this, interviews will be conducted as well as ethnographic research observing the process of a business converting their services to utilize QR codes and customer and staff reactions. More information on QR codes can be found in the theoretical framework chapter in subsection 2.1.

1.2 Motivation

The motivation behind this thesis arose during the worldwide Covid-19 pandemic when local and non-digital businesses had to learn to adapt to less physical customer flow while still maintaining business strategy. The task of this thesis project is to understand how businesses are developing their services with the use of QR codes to meet user needs amidst the social and physical restrictions stemming from the Covid-19 pandemic and where this change has hurt or helped business strategy.

This thesis is advantageous to businesses, services or products that are considering digitizing their offerings through the use of these codes as well as offering examples of successful ways businesses have managed to provide for their customers while pandemic restrictions continue to apply. The relevancy is also advantageous as more waves of the virus are causing more businesses to adapt.

1.3 Research Question

As the COVID-19 virus continues to implement change to worldwide economies there are still a lot of opportunities to understand how businesses can adapt to the current climate of social distancing, heightened hygiene measures and increased safety ordinances for their customers (Seetharaman. 2020). Hence, the research for this thesis will aim to address the following question:

How can businesses adapt their products and services using QR codes to continue customer engagement amidst physical and societal restrictions?

To effectively answer the question, the following will guide the focus of the research:

1. How can businesses engage digitally with their customers?
2. How can these methods prevent user friction and maintain business strategy?

With these questions supporting the main research question, accurate results will hopefully arise.

1.4 Objectives

The preliminary that have been set to this thesis are:

- To understand how small businesses have adopted the use of QR codes in order to provide products and services to their customers.
- To learn the pain points and user friction that businesses experience because of this change.

The concrete results of this project will be a research paper and academic references for my topic.

The secondary and learning objective is as follows:

- To observe and comprehend changes in the business experience in the case of QR code development.

1.5 Project Focus and Scope

The project focus is on small businesses in the Lexington, Kentucky (USA) area that have completed or begun the process of digitally transforming a service into QR codes. This thesis will cover the definitions of QR codes, COVID-19 and small businesses deemed "non-essential". It will also include interviews with the owners of 4 businesses and cover

ethnographic findings of how the transformation process has been and what pain points or successes have come from the change.

This project is not focusing on the origination of the QR code, nor it's development overtime although a brief history and explanation will be given. This project will also not focus on the origin of the Covid-19 pandemic but will include a brief definition and understanding of its impact for future reference.

For the scope of this project, 200 hours have been reserved specifically for thesis research and understanding. Other hours of research are in conjunction with the current daily work of the thesis author outside of research efforts only for the thesis.

This project will start in August 2020 and will conclude in December 2020.

1.6 Research Advantages and Disadvantages

An analysis of the advantages and disadvantages of this topic was made before research began. This was vital to understand what methods were preferred and better to approach the research topic.

Advantages

Currently working in a digital company, it was easier for the author to find information that was relevant for this situation. This allowed for more resource acquisition as well as understanding of the digital transformation process.

Living and working in the geographical area helped the author focus on local businesses and sectors where QR code adoption was increasing. This allowed for purer ethnographic research as well as personalized interviews with the business owner/key decision maker. Geographically, it was also advantageous as the US continued to have steady COVID-19 cases throughout the period of thesis research. (John Hopkins University, 2020).

Disadvantages

COVID-19 created some difficulty as local ordinances created restrictions not normally in place for businesses. Because of this, it was a challenge to observe in some locations where social distancing or lack of space existed. This also created small obstacles when it came to interviews which resorted in using digital alternatives to conduct the interviews.

There is a lot of research pertaining to QR codes and digitalization of businesses but not a lot on how QR codes specifically are changing businesses during the pandemic. This

could be for a few reasons. One being that the pandemic is a recent event and still ongoing, so effects of it are still being observed and businesses are still adapting to the changes. The second is that businesses that are switching to QR codes are still adjusting to the change in customer mindset around using a digital method which causes a lot of pain points for the business and user.

1.7 Tools/Resources

In order to properly collect and analyse data, many tools and resources were used to organize and communicate concepts and information. They are as follows:

In the pre-research phase tools such as Microsoft Word, Zoom and Microsoft Teams were all used to communicate thesis topic ideas and issues with the thesis advisor. A software called Tom's Planner was used to organize and schedule the thesis process.

In the research phase, Zoom, a digital communication platform, was used to conduct and record interviews with business owners- with their permission. Notes were stored and organized using Microsoft Sharepoint. Transcriptions of the interviews were attempted using a software called Happy Scribe but was also checked by the author for accuracy with Microsoft Word. Data analysis was done using draw.io. Theoretical data was collected through the scholarly resources: Google Scholar, JStor, Theseus, and the Haaga-Helia Library.

Through the entirety of the thesis process, the thesis advisor and BIT thesis course were resources to guide the direction and template of the thesis.

1.8 Thesis Organization

This thesis has been divided into five sections + references and appendices.

The introduction section provides an overview of the entire research plan, including the relevancy background, motivation, research questions, advantage and disadvantages, as well as project focus and scope. This allows the reader to understand the background of the thesis as well as it's relevancy at the time it was written.

The second section is the theoretical review and will give a brief background and definition of terms used throughout the thesis, bringing in previous research and findings to promote understanding for the later sections.

The third section is the empirical review and explains the methods used in the thesis research process. This includes their definitions and individual objectives in order to help the reader understand the source of information discussed later in the thesis.

The fourth section is analysing the results. This section will interpret the data summarized in the previous section to extrapolate insights used to answer the research question mentioned previously.

The fifth and final section will go into the ethical viewpoints, trustworthiness as well as conclusion and future development opportunities for this topic. Finally, evaluation of thesis process, as well as self-learning will be discussed.

2 Theoretical Review

This chapter outlines the supporting background research to the information discussed in the thesis. Subchapter 2.1 will define and explain QR codes and give examples of how they are used in some business environments giving the reader an explanation of their relevant use at the time of writing this thesis. Subchapter 2.2 will define the Covid-19 pandemic and why its impact is substantial to businesses. Subchapter 2.3 will give the reader an explanation of the term “non-essential” businesses, which were the focus business type of this study. This information helps create an understanding of context in the following chapters where empirical research is conducted.

2.1 QR Codes

QR codes, also referred to as quick-response codes or 2D barcodes, are machine-readable labels that contain various information- usually about the product or service in the environment it is found. In a majority of use cases, it contains a link or URL that offers to direct the user to a website or link.

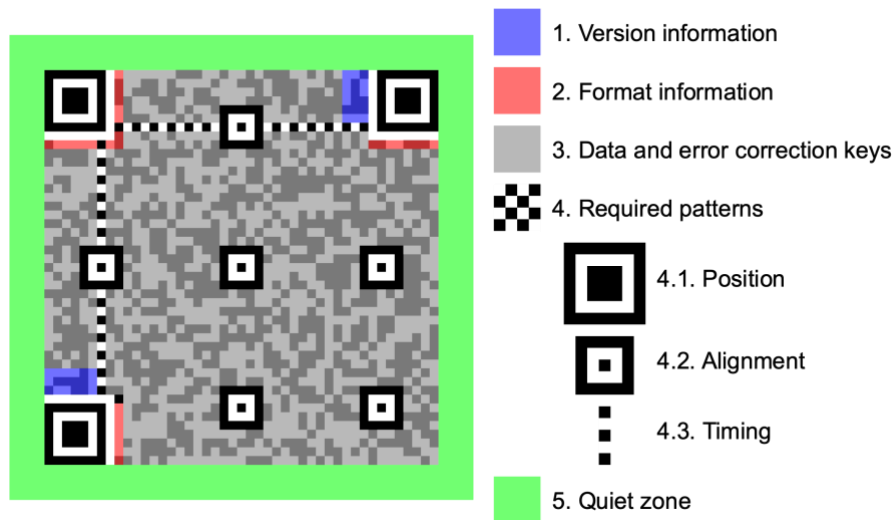


Figure 3: QR Code Structure. April 2011 (Source: Richard Wheeler).

They were first designed and implemented in 1994 in Japan as a method to track and organize the production of auto components. (NHK World, 2020). Adoption rapidly spread throughout Asia but its visibility and use has already been seen worldwide in the pre-pandemic era in a variety of business sectors (Ryu & Murdock. 2013). In 2011, nearly 14 million Americans scanned QR codes with their phone in the month of June only. (Internet Retailing, 2011). Since then, the usage and visibility of the QR code has risen with a predicted 2 million more American households using QR codes by the end of 2020. (QR Tiger, 2020).

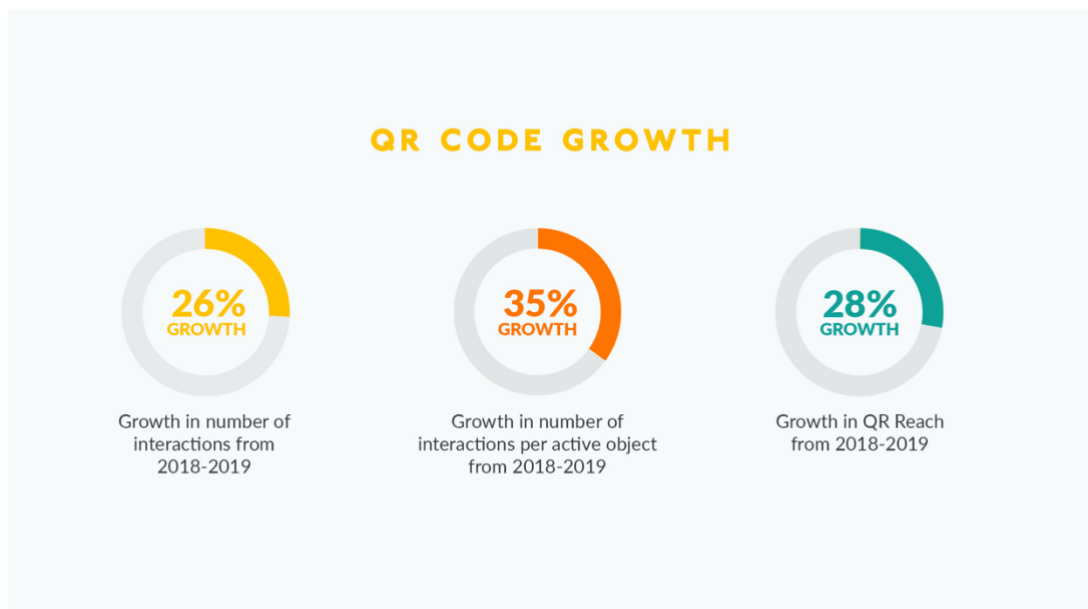


Figure 4: QR Code Growth. May 2020. (Source: QR Tiger).

In order to interact with a QR code, a user must open their camera app on a compatible smartphone, automatically scan the QR code and click the link suggestion that appears

once the phone has successfully read the code. This link can direct the user to a URL, online file or another digital location.

In the use cases of this report, users are primarily scanning QR codes in order to access a service/product menu or feedback forms from a participating business. However there are many alternative uses to these solutions with QR codes. They have been used in various locations like museums, schools and real estate for visitor orientation. Users can scan a QR code and a map or location information appears to help guide the user to where they are needing to go. Schools have begun to use them to embed learning material and extra resources for students to utilize when completing homework assignments. In product development, they have been used to track and enhance the access of information on those products as they are manufactured. This also allows analytics to track user behaviour once they QR code is scanned (Ozkaya & Ozkaya, Roxas, Bryant, Whitson. 2015).

In this thesis, QR codes were used for 2 primary purposes. The first was to access a list of services/products that the business provided for the user. Examples include food and drink menus as well as a digital product catalogue. The second use was to lead the user to a feedback form, to allow them to give feedback on the business, product/service or their experience while interacting with the business.

2.2 COVID-19 Pandemic

The COVID-19 pandemic (also known as the Coronavirus Disease 2019 Pandemic) is an ongoing worldwide pandemic that traces the spread of SARS-CoV-2 virus and is thought to have originated in December 2019 in Wuhan, China. (Shereen, M.A. & Khan, S., Kazmi, A., Bashir, N., Siddique,, R. 2020). Spread of the virus can happen through direct contact with a primary host contamination or an intermediate host as shown in Figure 4. Intermediate hosts can show symptoms but there are asymptomatic carriers who spread it through human to human contact.

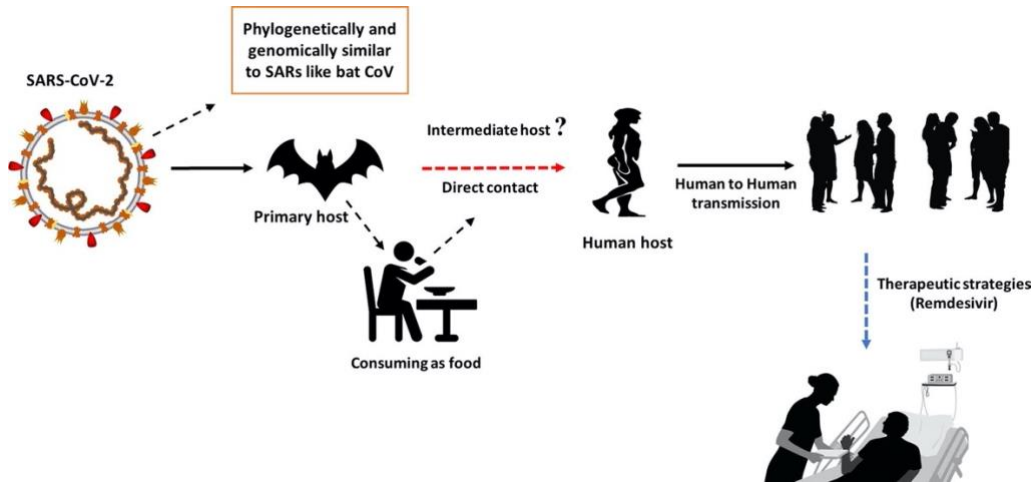


Figure 5: The key reservoirs and mode of transmission of coronaviruses. March 2020 (Source: Journal of Advances Research).

Due to its severe impact on the respiratory system, it is deemed highly contagious and has caused the deaths of over 1 million people worldwide. In the United States alone, there have been over 8.6 million cases with 225,111 deaths caused by the virus. (John Hopkins University, 2020).

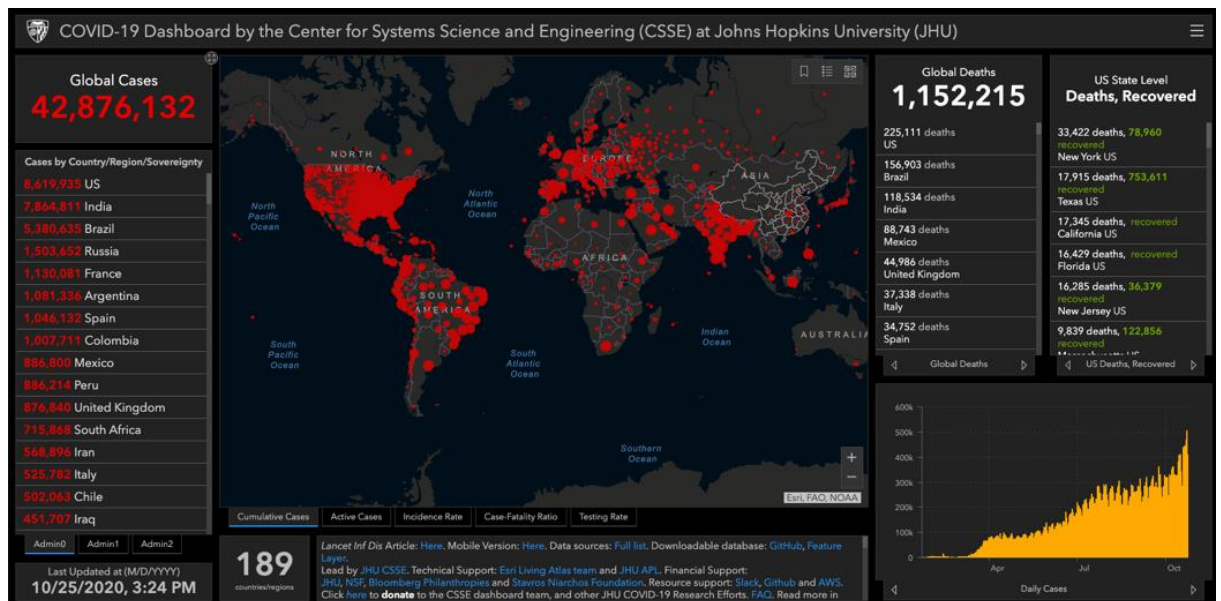


Figure 6: COVID-19 Dashboard. October 2020. (Source: John Hopkins University)

Due to the dangerous and contagious nature of this virus, many government ordinances have been put in place to try to reduce the amount of people exposed to the virus. This includes travel bans from country to country, strict self-quarantining laws, the mandatory wearing of protective face masks when out in public as well as 6 foot (3 meter) social distancing between people not in the same household.

Businesses and supply chains have struggled to continue their strategy as they are seeing less and less customers physically coming into their stores. (Seetharaman 2020). Because of this, they are having to adapt their business actions and strategies to meet their customers' needs while also maintaining the health and safety of their employees.

In this thesis, Covid-19 is the motivating factor behind a lot of changes that the business owners interviewed have had to adopt digital methods to keep their customers happy. These results will be further discussed in chapter 4 subchapter 4.3: Outcomes of pandemics and restrictions.

2.3 “Non-essential” Business and Geographical Locations

“Non-essential” business is the term given to businesses that aren't considered essential for life-sustaining purposes. This term was used to differentiate the businesses that could stay open during the pandemic according to local ordinances. As the geographical location that this thesis focuses on is in Kentucky, the list and definition derives from the authority of the Kentucky governor, Andy Beshear.

**Executive Order 2020-246
List of Life-Sustaining Retail**

		Notes
Motor Vehicle and Parts Dealers		
Automobile Dealers	No	Dealers may provide repair, parts, and service, but showrooms must close.
Other Motor Vehicle Dealers	No	
Automotive Parts, Repair, Accessories, and Tire Stores	Yes	
Auto, Truck, and Van Rental	Yes	
Furniture and Home Furnishings Stores	No	
Electronics and Appliance Stores	No	
Building Material and Garden Equipment and Supplies Dealers	Yes	
Banks, Credit Unions, Check Cashing, Wire Transfer, and Other Financial Services	Yes	
Food and Beverage Stores		
Grocery Stores	Yes	
Supermarkets	Yes	
Specialty Food Stores	Yes	
Meat Markets	Yes	
Fish and Seafood Markets	Yes	
Fruit and Vegetable Markets	Yes	
Beer, Wine, and Liquor Stores	Yes	
Health and Personal Care Stores		
Pharmacies and Drug Stores	Yes	
Cosmetics, Beauty Supplies, and Perfume Stores	No	
Optical Goods Stores	No	
Other Health and Personal Care Stores	No	
Gasoline Stations and Convenience Stores	Yes	
Clothing and Clothing Accessories Stores		
Clothing Stores	No	
Shoe Stores	No	
Jewelry, Luggage, and Leather Goods Stores	No	
Sporting Goods, Hobby, Musical Instrument, and Book Stores	No	
General Merchandise Stores		
Department Stores	No	
General Merchandise Stores, including Warehouse Clubs and Supercenters	Yes	
Miscellaneous Store Retailers		
Florists	No	
Office Supplies, Stationery, and Gift Stores	No	
Used Merchandise Stores	No	
Pet and Pet Supplies Stores	Yes	
All Other Miscellaneous Store Retailers	No	

Figure 7: List of Life-Sustaining Retail. March 2020. (Source: Executive Order of Kentucky).

Throughout 2020, restrictions have adapted to the current state of pandemic numbers and phases of re-opening have occurred which allow non-essential businesses to reopen with restrictions. Figure 7 explains the phases and their estimated start dates. The business

owners interviewed were all given permission to open their businesses in Phase 1 and 2 with restriction set in place such as limited capacity and requirement to wear a face-mask when in the public space shared by customers and other workers.

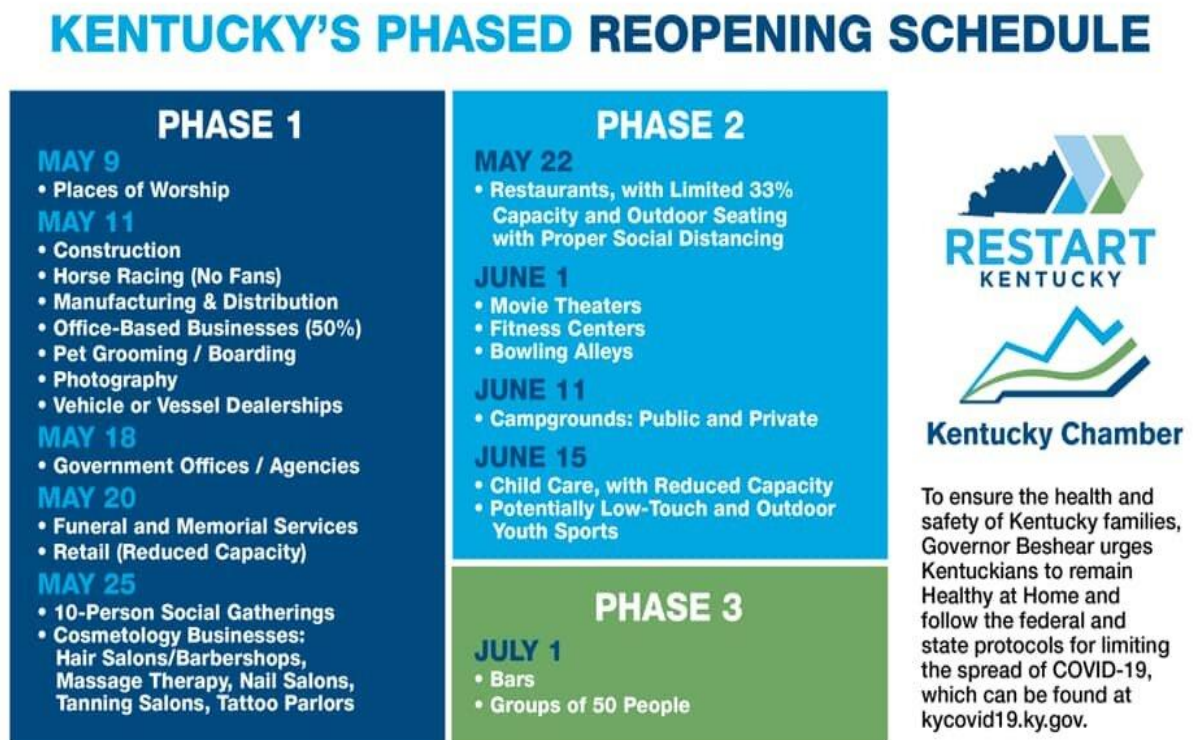


Figure 8: Kentucky's Phased Reopening Schedule. May 2020. (Source: Kentucky Chamber).

Because of the distinction of non-essential businesses and their phased re-opening, this thesis and the interviews conducted focus on 4 businesses that fell into this category.

3 Research Methods

Empirical research was used to combat and answer the research question previously mentioned. The methods and process are explained in this section and results of this process can be found in section 4. Quantitative data was used to overall understand the theoretical research but qualitative data was used to collect and understand information in the interviews and ethnographic research conducted,

To fulfil the purpose of this thesis, quantitative and qualitative research methods were used respectively in certain sections. Because of the scope and goals of this thesis, quantitative data was collected solely through scholarly articles and previous academic research on QR codes, the pandemic and also digitizing business efforts.

Qualitative research is research that focuses on the perspectives of the individuals being observed. As Bell writes, “researchers adopting a qualitative perspective are more concerned to understand individuals’ perceptions of the world” (2010). This information is usually acquired via more personal approaches such as interviews, focus groups, observations or surveys which allow the participant to freely express their thoughts, actions and emotions from their own perspective. For this thesis, the collection of qualitative data was based in the research question of “how” and “why” businesses are transitioning to QR codes and not quantitative data that focuses on “how much” or other tangible statistics.

Qualitative research was gathered through online interviews with 4 business owners in the Lexington, Ky area. Geographical location is important as the researcher visited each owners business location to conduct ethnographic research and observations of businesses converting to QR codes and customers using the QR codes. Interviews was the chosen method because of it’s semi-structured approach to allow the interviewee to express their experience in a way that was easier for them to communicate (Silverman, 2018). The selection of these participants is further explained in 3.1.2 Phase 2: Gathering interview participants. Interviews were chosen over surveys or questionnaires because of their qualitative nature and to understand the benefits or hinderances of the adoption of QR codes and not data that can be collected quantitatively (Silvermann 2019).

Ethnographic research was also used to conduct the study of this thesis. Ethnographic research is research that is conducted while the researcher is immersed in the world of the subject. This allows the researcher to understand the environment, behaviors and habits of those involved in order to better understand the underlying cultural traits of those

being observed (Bell, 2010). This was chosen as the observational technique in order to see how businesses are making the decision to adapt their services with QR Codes and how customers are interacting with them. Ethnographic observation was ideal as it promotes a raw integrated experience for the researcher to be exposed to the normal form and perspective. (Agrosino, 2007). Ethnographic research was conducted over the course of 5 hours in the 4 locations (5 hours x 4 locations= 20 hours) owned by the business owners conducting their interviews. The goal was to make observations on the behaviors of the users when informed by the business staff to use QR codes to examine their product lists.

The research conducted for the theoretical framework was used to help formulate the interview questions to maintain topic. Because of limited time, there were 9 main questions and subset questions, but the interviewees were allowed to withdrawal their response or refuse to answer the questions if they were not able to answer them. The author used 3 resources to help frame the questions in order to extrapolate themes and information in the interview, as well as analyze the data. For example. Kvale and Brinkmann (2009) helped formulate the interview stages: thematizing the interview, designing, interviewing, transcribing, analyzing, verifying and reporting.

To prevent bias, semi-structured, non-leading questions were formed to allow the interviewees to answer freely from their own mindset and experiences. Semi-structured is preferred as it does not constrict as much as a structured questionnaire but it also thematically organized as to gain insights through subset conversation themes that arise in each interview. (Kvale & Brinkmann, 2009).

3.1 Phase 1: Thematizing/Designing the Interview

The interview consists of 9 semi-structured questions which allow the interviewee to help the researcher understand their adoption of QR codes in their business. This theme was chosen through the thesis topic and research question. The resulting interview questions were created with the guide of the theoretical research done before the start of the empirical observations. The goal was to give a prompt to the interviewee but allow them to also address other aspects of their business that weren't specifically asked in the standard questions. The structure was casual and allowed for room for discussion and understanding after each question. This structure was recommended from DiCicco-Bloom and Crabtree (2016), with no more than 10 questions and keeping it semi-structured as it doesn't restrict the information through unconscious biases and allows the interviewee to

freely discuss their ideas and experiences without exhausting them with an abundance of questions.

3.2 Phase 2: Gathering interview participants

Interview participants were gathered through the social and career networking of the thesis author. Five to seven businesses were approached and permission was given by 4 to have interviews conducted. The goal was to have 1-2 different retail sectors as well a diverse demographic selection of interviewees. This was to have a diversity of experiences as well as a diversity in customer segments which could have different experiences using the QR codes. Interviewees were sent a waiver that explained the project name and the terms of their participation. For an example of the waiver sent to interviewees, see Appendix 1: Interview Waiver. After the waiver was returned, an interview was scheduled.

3.3 Phase 3: Conducting interviews

Interviews were conducted via Zoom and were audio recorded at the permission of the participants. After a brief introduction and verbal expression of permission, the interviews began. They were conducted over Zoom and were recorded with explicit permission from the interviewees using a Voice Memo app on my iPhone XR and the screen recording application available on Macbooks. This was to ensure accuracy when analysing the results.

Interview Questions:

1. Can you tell me about yourself and your business?
2. Before the pandemic, what digital technology was used to meet your customer needs?
3. How has the pandemic affected your business?

(What immediate actions had to take place when ordinances were put in place for non-essential businesses? What does it mean to be "non-essential"? How has this affected the businesses yearly strategy? How much of an impact did this have?)

4. In what ways have you had to adapt to meet customer needs?

(How digital was the business before the pandemic? What unforeseen changes had to happen in order to comply with local ordinances? What options and solutions were discussed and attempted?)

5. What was the process to make the decision to use QR codes to help with business needs?

(Why was QR code chosen over other possible connection methods? What was the process of creating the QR codes for the business? Was the transition 100% of your offerings or were there certain products/services that had to be excluded?)

6. How were they created for your business?

7. How did your customers and employees react to this change?

(What difficulties did the business and their customers face? Was this a more convenient method to deliver services? Could this be a new method of product/service delivery after the pandemic?)

8. What pain points and positives did you see coming out of this use of QR codes?

9. Could this be a method you continue to use, after the pandemic ends?

Interview Details:

Interview Date	Participant Alias	Business Alias	Duration	Method
14. Oct 2020	A	Restaurant 1	45 min	Zoom
16. Oct 2020	B	Retail 1	55 min	Zoom
20. Oct 2020	C	Retail 2	39 min	Zoom
27. Oct 2020	D	Restaurant 2	50 min	Zoom

Table 1: Interview participant details

After the interviews, the researcher transcribed them in order to assist with Phase 5: Coding and Grouping Data.

3.4 Phase 4: Ethnographic Research

Ethnographic research (E.R.) was conducted alongside interviews in order to observe the creation of QR codes and the use of QR codes amongst the patrons of each location. Owners gave permission as long as capacity restrictions were not exceeded (30% in each location) and as long as it didn't interfere with the staffs' ability to conduct business. Ethnographic research was done over the course of 4 days in each location with each

session totalling 5 hours. Therefore, the end ethnographic hours were 20. This did not include the commute and transportation to each location. Ethnographic research is recommended when the researcher wants an objective understanding of a community or situation. Usually the research is a subjective participant but an objective observer in order to understand the environment on a more personal level. This is recommended to understand the social constraints and behaviours more quickly in order to extrapolate more pertinent data (Agrosino 2007).

For this exercise, the author visited each location with the following prompts as observational goals:

1. Where are the QR codes located in the business environment?
2. How quickly does it take customers/consumers to find and scan them?
3. How does the staff promote the scanning of the codes?
4. Is there any refusal to use them after they have been “discovered” by the customer/consumer?

The point of these specific observations was to backup and legitimize the business owners feedback and experience with how customers were using QR codes for business purposes. It also benefitted the business owners as it helped recommend good locations for the QR codes to increase customers point of contact.

Date of E.R.	Business Alias	Duration of E.R.	Method of recording
14. Oct 2020	Res1	5 hours	Field notes
16. Oct 2020	Ret1	5 hours	Field notes
20. Oct 2020	Ret2	5 hours	Field notes
27. Oct 2020	Res2	5 hours	Field notes

Table 2: Ethnographic research method details

3.5 Phase 5: Coding and Grouping Data

Interviews were transcribed using 2 methods. The first was an automatic tool called Happy Scribe. This tool was tested to ensure quality and accuracy beforehand by the author. After the audio was transcribed, the transcriptions were checked by the author through listening back over the recordings and editing words or errors. This service was used as opposed to the traditional hand-typing transcription to save time.

After the transcription, themes began to develop and the coding process began. Coding interviews is a technique used to extrapolate certain data points and group them across the different data resources (Burnard 1991). In this method, the researcher reads through the transcript first to get larger headings/themes. Then, they read through it a second time to support those codes but also break them down further into sub-codes. This process is repeated until there are no new sub-codes generated. Then, the researcher will begin to group the codes based off of their likeness. From there, extrapolation of data can occur. This is further discussed in the next subchapter 3.6 Phase 6: Extrapolation.

Information from the ethnographic research observations was included a sub-data points to support coded, extrapolated data from the interviews.

3.6 Phase 6: Extrapolation

After the data is coded, themes begin to emerge. Themes must be related to the research in question and often contain similar codes with new information. To assist with this task, mind-mapping was used. Mind-mapping is a method of data categorization which allows the researcher to group data in a visual platform to better understand information. This is a highly recommended method from researchers to help extrapolate themes with coded data (Braun & Clarke 2006). The tool I used for this was draw.io.

After themes are found, relationships between those themes are discovered. It is common that certain themes cross each other and are often connected through a mental model pattern and other codes. Below is an example of the mental models that incorporated the questions: *How has the pandemic affected your business?* and *How have you adapted?*

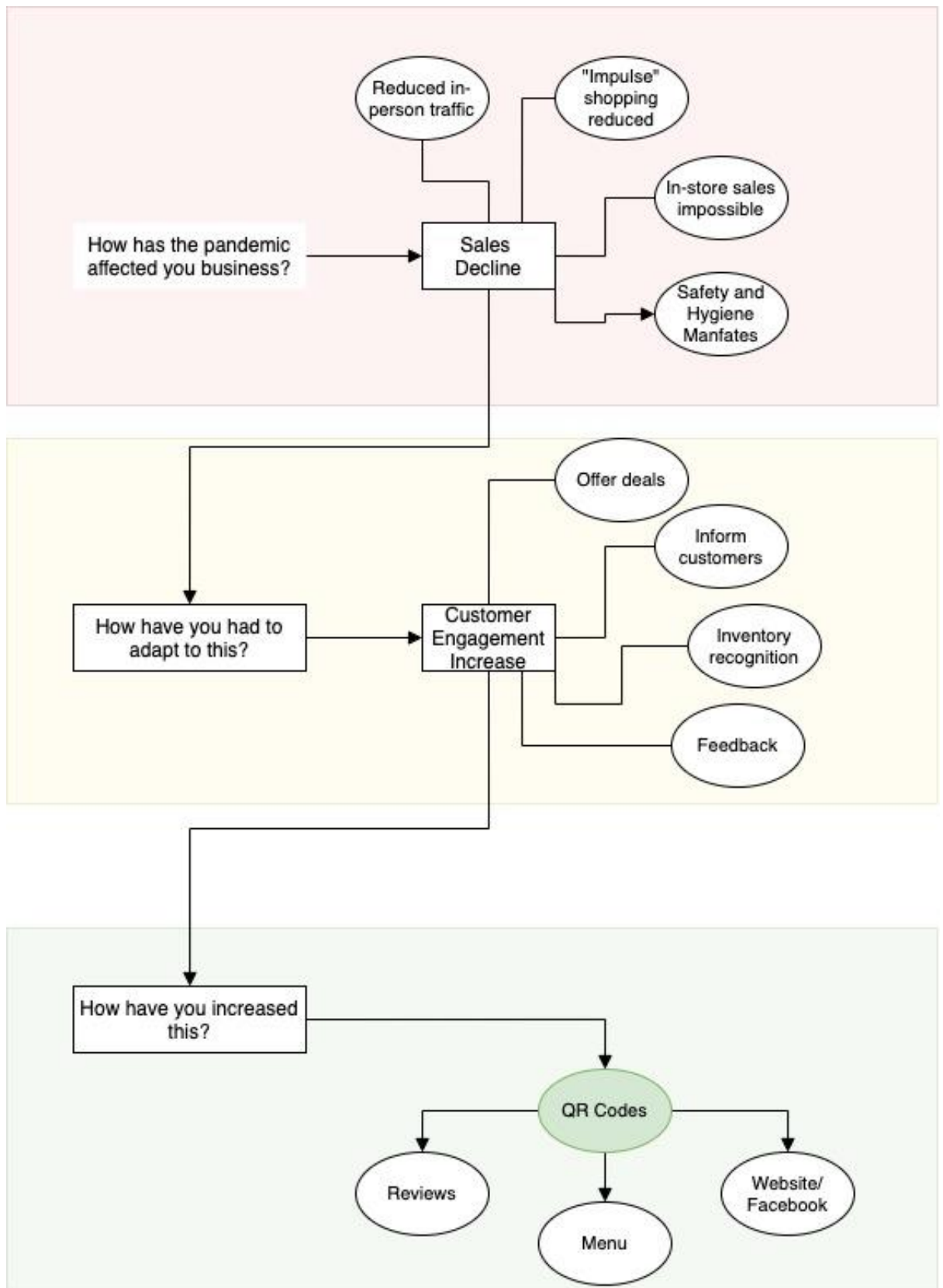


Figure 9: Mental Model Code Mapping

Themes are reviewed through going back over the data used to identify them. This is where singular coders are at a disadvantage. Often time, there is a subconscious bias when coding information and therefore it is more accurate to have multiple researchers

look over the themes and codes. Due to time restrictions and the nature of this research project, the author was the singular coder and theme creator.

Themes are then finalized after a review of the data sources proves accurate and acceptable. Themes and codes were created through quotations and direct words from the interviewees as to not skew the data or elaborate with different words which could create a different meaning and interpretation.

Context was gathered through the ethnographic research of the locations to ensure that the themes were deemed accurate to extrapolate information from.

4 Results

The results of the empirical research to understand how small businesses used digital QR Codes in order to assist their customers is presented over the next section. This section is divided into 6 subsections to help the reader better understand the data extrapolated from the research. Subchapter 4.1 goes into the background of the interview participant and the businesses they own and manage in order to help supporting background on the business environment and decision maker. Subchapter 4.2 discusses the effects of the pandemic on the business and restriction mandated on the businesses in order to give context to the business climate. Subchapter 4.3 explains the process the businesses went through to make the decision to adopt QR codes. Subchapter 4.4 explains the pain points and positives that came from the adoption. Finally, subchapter 4.5 goes into the businesses plan for future use of QR codes in their business strategy.

4.1 Background

Interviewees and Businesses

The interview participants were all owners of their respective businesses. Their backgrounds and demographics vary from years in the industry as well as gender and ethnicity. They also differ in how much time spent interacting with customers on a day-to-day basis with some interacting daily, while others every other day. Participants and businesses identities have been hidden to provide privacy and confidentiality to the owners. The information gathered came from the owners and public information was crosschecked in various local newspapers to ensure validity of dates and information. The following questions were used in order to get a better understanding of the business background and environment:

1. *Can you tell me about yourself and your business?*

2. *Before the pandemic, what digital technology was used to help meet customer needs?*

The purpose of these questions was to understand a base of environment and digital technology to comprehend how much the adoption of QR codes has changed the business.

Participant A and Restaurant 1

Participant A (PA) has been in the restaurant industry since 1990 when she worked as a waitress in various dining settings across the city. After graduating from the University of Kentucky with a master's degree in retail management, she decided to open her own restaurant in 2002. Her experience working at restaurants previously helped her overcome a lot of the complications that usually come with opening and managing a restaurant. She has been the manager of Restaurant 1 since it's foundation. Her main responsibilities include maintaining staff meets company goals, ensuring quality and safety with food handling and training, replying to customer feedback and ensuring satisfaction and maintaining inventory and payroll records.

Restaurant 1 (Rest1) was founded in 2002 by PA. They sell American diner food and have a large fan base with their customers because of the local influence of their foods. This business had one, singular location until 2010, when it opened up a second location in the city. Before the pandemic, they had an estimated 500 customers at each location a day and had 30 staff members total to accommodate the heavy volume of customers. During the pandemic, because of restrictions and other safety concerns, they average around 250 customers a day and continue with 20 staff members to accommodate customer volume.

Before the pandemic, Rest1's digital technology was limited to a website and social media such as Facebook and Instagram. Though the website was inclusive of the menu, pricing and other business information. Site traffic wasn't heavy as their customer base was local and was "regulars"- people who visit the restaurant frequently. They also used a cash register system to process bills, payments and keep track of staff tips.

Participant B and Retail 1

Participant B (PB) dabbled in retail work in high school but originally wanted to work as a graphic designer for large technology companies. They did not attend university but focused on self-teaching graphic design principles and building their portfolio, eventually

landing a design job in 2011. On top of her normal work, she began to freelance-designing t-shirts that became very popular amongst local university students. In 2017, she decided to make this her full-time job and opened her first and only store in 2018. She is the manager of this location. Her responsibilities include managing inventory, ideating new designs, ensuring customer satisfaction and maintaining payroll and staff schedules.

Retail 1 (Ret1) was opened in 2018 and was immediately popular with local university students. The store focused on selling collegiate and state pride focused apparel at affordable, yet profitable prices. The top business days are college sports game days and the seasons when university students are living on campus (Aug-May). Ret1 has around 100 customer a day in store during the peak seasons and around 60 a day during the low season. During the pandemic, customer volume dropped to around 50%. Because of the shift in customers, the store maintains 8 employees in their 1 location.

Before the pandemic, Ret1 was looking into a website to promote their items, but found that a majority of their customers were marketed through social media such as Instagram with over 150,000 followers as of November 2020. (Instagram, 2020). They also carried out a monthly mailing campaign where customers could receive coupons, news and bonus insider information through the mail. Other than that, they used a basic cash register for transactions and google calendar for scheduling.

Participant C and Retail 2

Participant C (PC) has worked in the retail industry for over 40 years. His family founded and owned the used bookstore that he currently manages until 2000 when the ownership was transferred to him. PC has a bachelor's degree in marketing and accounting but mostly enjoys spending time stocking inventory and helping customer's out on the sales floor. His main responsibilities include

Retail 2 (Ret2) is a local used bookstore that was originally founded in 1980. After transfer of ownership to PC in 2000, discussion of opening a second location began in order to accommodate customers on the other side of the city. The second, smaller location was opened in 2015. Despite it's small size, the bookstore would get around 200 customers a day and had 15 staff to help run the day-to-day operations. During the pandemic, customer numbers dropped to 100 but more books were purchased per customer than before.

Before the pandemic, Ret2 had an email newsletter campaign which offered customers coupons and sent them schedules of special events such as author visits or special discount days. Ret2 did not use a website, nor did they use social media for sales or customer engagement. For transactions, a basic cash register was used to track sales and a Microsoft Excel spreadsheet was used for accounting. Staff schedules were printed on paper.

Participant D and Restaurant 2

Participant D (PD) and his wife were the sole founders of Restaurant 2 when they opened it in 1978. Both immigrating from Germany, they wanted to open a restaurant that served German-styled beer and food. After his wife's death in 1990, PD was and continues to be the sole manager of the restaurant. His background in food service wasn't from a formal education, but from hobby. He enjoyed cooking and helping his mother cook meals as he was growing up in Germany. Though PD is the manager of the entire business, he has an assistant manager that helps with more day-to-day tasks such as customer experience, inventory, payroll and scheduling. PD's main task is overall business strategy and making sure the restaurant continues to offer exceptional service.

Restaurant 2 (Res2) is a German-styled restaurant and bar offering a variety of German dishes and over 500 types of beer. The bar opened in 1978 and continued to serve patrons with the exception of 2013 when it was closed for renovations. The bar doubles as a sporting venue as well, as in 2009, 6 indoor and outdoor sand volleyball courts were added so patrons could play volleyball in leagues and tournaments. Week nights when volleyball leagues are on-going and weekends are the busiest times of the week for Res2 as there is an increase of foot traffic. Before the pandemic and on high traffic days, Res2 can see around 400 customers. On low traffic days, the number is still upwards of 150-200. During the pandemic, the restaurant is seeing around 300 customers on high days and 100 on low days. This number continues to be high because the "bar" and "outdoor patio" titles give the restaurant different restrictions than indoor and dining-only locations.

Before the pandemic, Res2 used a website and social media to reach their customer base. The website was mainly used for the volleyball league schedules and the Facebook was used by customers to contact the restaurant for reservations. Transactions were recording through a software on the cash registers and schedules of staff were done via an app.

4.2 Outcomes of pandemic and restrictions

In order to understand the effects that the pandemic had on the business- and to understand the climate leading up to the decision of adopting the QR code, the following questions were asked:

1. *How has Covid-19 affected your business?*
2. *How did you have to adapt to meet customer needs?*

The questions were asked to all participants and there was no time limit nor restrictions put on the answers.

In each case, the businesses were temporarily closed to in-person traffic from the end of March to the end of May. This was because they were deemed “non-essential” and therefore mandated to close by government order. This meant that in-person sales dropped to zero and drastically disrupted yearly strategy and budget. According to PC, in the case of Ret2, this lowered the yearly sales figure by over 200,000 dollars as there were no alternative, digital sale platforms set up to help service customers. Res1 and Res2 quickly adopted delivery and carry-out as options in order to continue servicing customers but their profit also dropped by 50% (Res1) and 34% (Res2) respectively. Ret1 began utilizing their social media account and “live stories”- live videos accessible via their Facebook account- to sell items. The host of the video would showcase the item, price and sizes available and customers would comment what size they wanted in order to purchase it online. They were then contacted privately for invoicing information and then the item was shipped. Despite continuing to make sales via this method, retail sales numbers dropped 50% which was seen across the United States according to Market Watch (2020).

Even after the allowance to open back up, businesses were struggling to bring back the pre-pandemic customer and sales numbers because of state mandated restrictions (Executive Order 2020-232).

These include:

- Limited Capacity (50%) of fire-code regulated capacity.
- Mandated requirement of wearing a face mask by both customers and staff at all times. (The exception being when customers are seated at their individual tables).
- Six feet (2 meter) social distancing requirements.
- Providing adequate hand sanitizer and encouraging hand-washing.

- Conducting temperature checks on patrons and/or staff.
- Access to hand-gloves and requirement of wearing them in settings where food is handled.
- Proper education and training of staff to ensure best hygiene practices in the workplace.

Because of these restrictions, more money was spent on ensuring that all of these were met and in accordance to law, before customer foot-traffic could continue. In the case of Ret1, it continued to close for 1 more month as properly getting their location into accordance meant reorganizing the interior furniture and inventory tables to allow 6-foot socially distanced space and adequately located hand-sanitizer.

4.3 Process of adapting to QR Codes

The mental model that derived from the interviews with the 4 businesses consisted of 3 similar steps in the decision to incorporate QR codes: Sales Decline, Customer Engagement and Digital Solution, demonstrated in Figure 10 below.

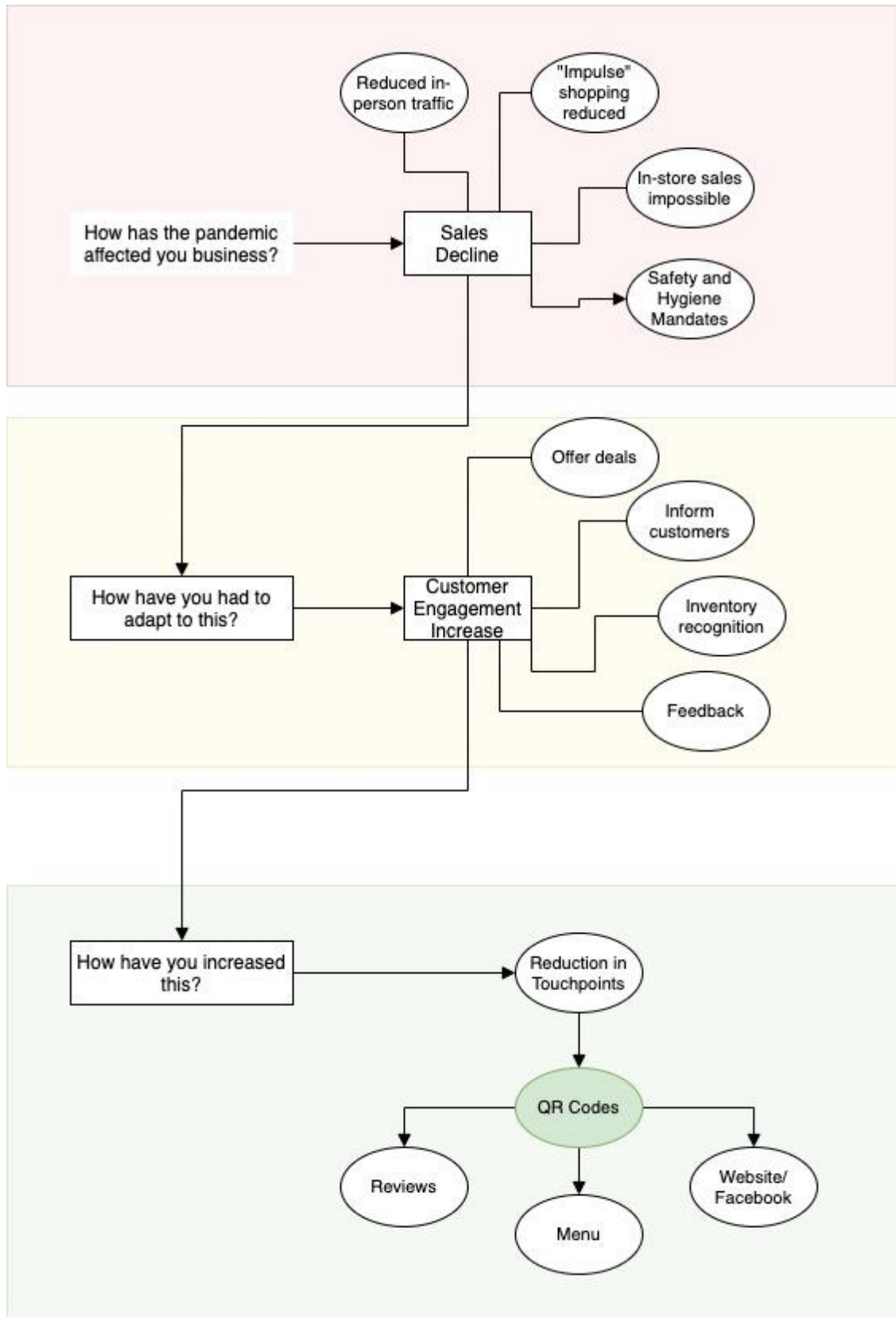


Figure 10: Mental model of QR decision making

Sales Decline

The declination in sales was the number one motivating factor behind adapting the business strategy in each of the 4 business cases. Whereas Res2 suffered the least amount of sales loss (34%) compared to Res1 (40%), due to their quick adoption and transition to pickup orders and delivery, Ret1 and Ret2 both suffered around a 50% loss in profit while closed to in-person traffic. Even after allowance to re-open, strict government mandates continued to show a reduction in sales as limitations on capacity, opening times and other disruptive rules were followed.

PA attributes the decline in sales to the elimination of full-capacity environments as this reduced “impulse” purchases such as extra drinks, desserts, etc that many customers make. This was also brought up by Ret1 and Ret2 who said that impulsivity was often a leading cause of increase of sales per customer as customers normally come for one item but browse and pick up more than anticipated.

Another attributing factor was the health and safety mandate on each location. Customers were required to wear masks, social distance and follow strict rules while in each location. Customers who forgot their masks, could not follow regulations or chose not to follow regulations were all not given permission to enter the business. Many customers were asked to leave- disrupting their sale, because they were not meeting mandated expectations. On top of that, any employee or customer who tested positive for the virus or showed symptoms of the virus would force the business to implement a “shut-down” plan which meant that they had to shut down in order to contact trace the virus to ensure no other staff or customer was exposed. For cautionary reasons, this meant complete disinfection of the physical location of the business and a full report to alleviate any potential legal issues.

“We had one staff member who registered a fever of 101F [38.3C]. They had worked all weekend where they could have potentially exposed 4 of my other staff members and over 100 customers. We had to initiate our temporary shut-down plan which meant we closed for 2 of our busiest weekdays and lost the sales for those days...” (PD, Res2).

Sales also decreased because of the limited space and capacity in retail environments. Whereas pre-pandemic, customers were able to browse without fear of close proximity to another person, emphasis was put on ensuring a safe distance between everyone.

“We noticed that customers were extremely cautious of interacting with the staff as well as other customers. Our shop is so small that maintain 6-foot distance made it difficult for our customers to browse our inventory.” (PB, Ret1).

In order to alleviate the decline in sales, the owners of the businesses had to create new ways to meet their customer needs. As stores were allowed to open up with restrictions in place, new ideas on how to best engage with customers in a safe environment began to emerge.

Customer Engagement

The participants all noted that increased customer engagement was their goal after sales began to decline, with 3 out of the 4 participants noting health and safety as a concern with bringing customers back into the store. Many of the participants mentioned thinking that their “regulars” would begin coming in after they were allowed to open up, but PA, for example, noticed that there was a decrease in customers who were often engaged with the staff and social media accounts that weren’t coming in to eat as often as before.

“I saw a regular customer after a couple months and asked them why they didn’t come to the restaurant anymore. They told me that they were worried about the menus. Even though we made sure to wipe them down, the concern was that we would ‘miss a spot’ or mix up the sanitized menus with the non-sanitized ones... it seemed there was a big concern for safety and hygiene.” (PA, Res1).

In order to alleviate this issue as well as reduce the time it took for the staff to wipe down and sanitize each menu, Res1 and Res2 both adopted printed paper menus which after the customer would look at, would be thrown away to reduce the risk of cross-contamination with other customers or staff. This created an expensive, unsustainable issue which, as PD mentioned “cost more to print than it felt we were making”.

Both restaurants also noted an issue with guest gathering at the hostess stand, waiting to be seated. Due to capacity limits, wait times were longer than anticipated. Because there was no way to inform the customers that their table was ready, many were gathered in the

small lobbies which posed a risk of contamination as well as government ordinance violations.

In addition, both retail businesses believed customer engagement was dropping because of a lack of ability to browse the inventory therefore having no knowledge of what else was available. Whereas customers made impulse purchases before, now there was a bigger concern with touching objects that the customer might not really intend to purchase. For example, PC noticed that customers were afraid to reach for books to read the back of them for further information.

“It was obviously a big change. We used to have customers who would come in with a book or genre in mind. Just by directing them to the area they were looking for, we’d notice them checking out with 3-5 different books, when they only intended to come in for one...the fear of touching a book someone else had touched became so big that we had a couple customers asking us to pick them up for them since we had gloves on.” (PC, Ret 2)

Finally, a big consideration for all 4 participants was proximity of customers to their staff members. In the restaurant settings, customer facing employees such as hostess stands, waitresses and bartenders were constantly at risk while interacting with customers on the job. In retail settings, sales associates, cashiers and customer service reps were at-risk with customer interactions. While businesses were looking into building an online shop, they still wanted to maintain the opening of a physical location and began to look into digital solutions that could help bridge the gap between customer engagement and safety. Figure 1.1 was ideated by PA and confirmed by PD in both restaurant settings. It demonstrates the potential contamination/touchpoints of one customer in their journey in a restaurant. First, there is a potential contamination of the hostess when the customer is checking in to be seated. Then the customer is seated and waited on by the waitress who will interact with the bartender and chef. Both the hostess and waitress then will continue to interact with other customers who come into the store.

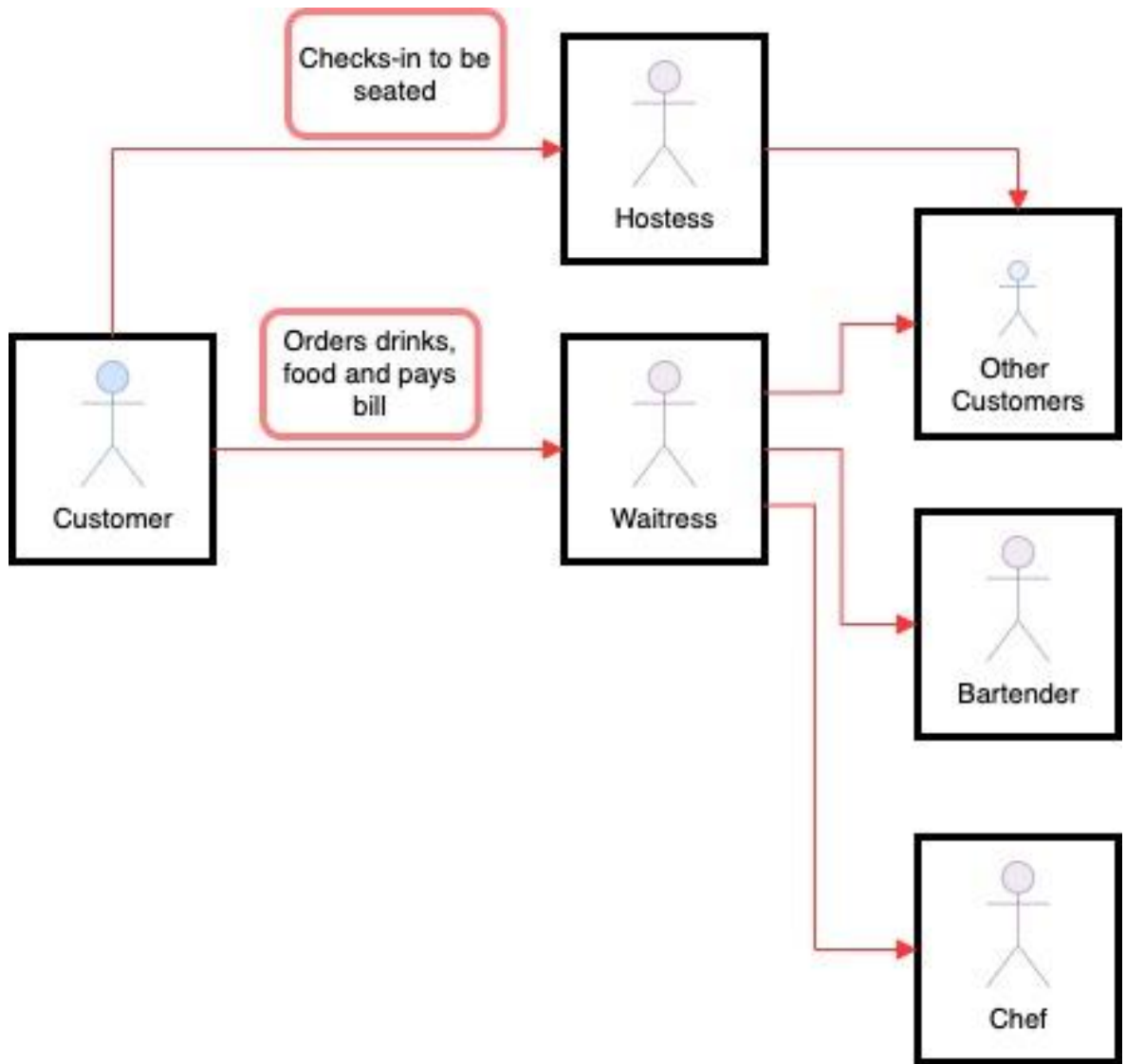


Figure 11: Customer touchpoints for Res1/Res2 before QR solution

Figure 12 demonstrates the potential customer touchpoints of a retail customer. It was ideated by both PB and PC and confirmed with both parties. In this figure a customer interacts with a sales associate asking them for a particular item or recommendation. They also interact with the cashier as they go to pay for their purchases. In the case of Ret2, where they also buy used books from their customers, a potential touchpoint would be the buyer who would price and bargain for the used books. All three of these staff members would then go on to interact with other customers.

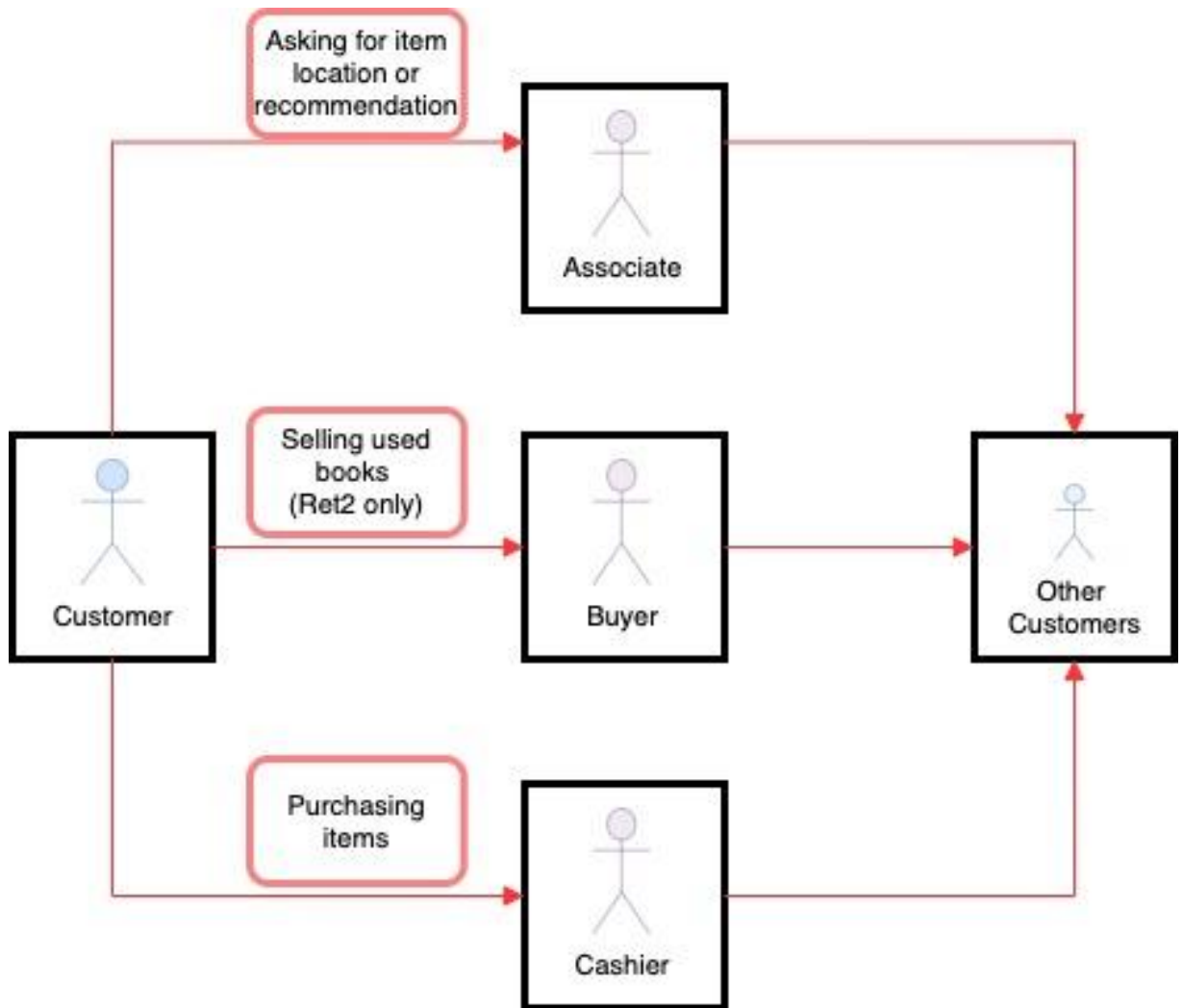


Figure 12: Customer touchpoints for Ret1/Ret2 before QR solution

In both of these customer journey maps, the touchpoints of one customer could go on to affect the staff and other customers which could then close the business temporarily in case of infection or contact-tracing. Therefore, all participants mentioned beginning to research potential ways to alleviate these concerns with digital solutions while also continuing to serve customers.

Digital Solution

Brainstorming of ideas began quickly for the businesses once they realized they'd be mandated closed for a few months. As mentioned before, both restaurants began to look into delivery and take-away services, but still struggled to maintain good customer traffic. In the retail sectors, despite having a large social media following, Facebook live campaigns for Ret1 still didn't result in decent profit.

For PA, QR codes were already a consideration after seeing successful adoption of it in a couple restaurants around the city.

“I had seen a couple places do it here first. I’m not sure if they had already started doing it before all this, but it was so simple. Customers could scan the code to access the website of the restaurant to sign up for offers...I thought ‘What else could we use this for?’ and the menu was the first thing that popped into my head. Sure enough, I went into another restaurant and saw that you could scan on for their menu.” (PA, Res1).

PD also had a similar experience when he read an article about the rapid growth of QR codes in other states in the US.

“I read that New York restaurants were using them to show menus and also to help people pay for the food. I immediately started googling them and thought they were a great solution to a lot of our worries.” (PD, Res2).

On the retail side, PB and PC both mentioned using QR codes as a means to get feedback from customers before the pandemic began. Customers could scan the QR code which would take them to a survey to get customer feedback. In some cases, the QR code would take them to a contest or giveaway that the store was sponsoring, however it was not used by many customers.

Eliminating touchpoints became the main motivating factor behind the adoption of the QR codes and soon, ideas began to circulate about the potential of improving customer engagement. The 4 businesses began creating lists of the things they’d want QR codes to potentially replace. Below, Table 3 represents the list of wants for QR codes in each of the

businesses with many features overlapping the two sectors including menu/catalogue access as well as item info and feedback forms.

	Res1	Ret1	Ret2	Res2
Menu/Catalogue	X	X	X	X
Item Info		X	X	
Map			X	
Pay		X	X	
Check-In	X			X
Feedback	X	X		

Table 3: Feature list of businesses

Once QR codes had been decided as the digital solution, the businesses began to create them. All 4 utilized free, online QR generators which linked directly to ecommerce stores that were either set up already or were set up during the pandemic. In order for that to happen, links had to be established to allow the customers to access the businesses information. In cases of Res1, Ret2 and Res2, there was already a hosted website existing, therefore it was easier to update the website and send users to the pages that contained the information they were trying to get. In the case of Ret1, a website had to be created in order to allow customers to go to the proper URL. This postponed the QR use for a few weeks as the website was being designed and developed.

Once the QR codes were generated, they were strategically placed around the business location. Access to the check-in feature for the restaurants were placed near the front door and hostess stand. The QR codes that gave access to the menu were placed on each table for customers to scan and the code that gave access to the catalogue of items, item descriptions and map were placed around the retail environments near the items or category of items the QR code would link to. The QR codes that led customers to the payment options was placed near the cash registers and also on the restaurant tables and finally the QR code that directed customers to the feedback forms was located on the

receipt and also near the cash register where customers had a higher chance of seeing the code.

During the creation and placement of the QR codes, concerns of security and technological capabilities arose. One big concern came from Ret1 when dealing with payments.

“Because we had never had a website before, having ecommerce as an option was a little concerning. We didn’t want to be responsible for somehow driving customers to the incorrect place and them losing their money because of us.” (P2, Ret1).

Other concerns came from the adoption of the codes. In all cases, the owners were concerned about their customers not adopting the QR codes and wanting to revert back to the other touchpoint-heavy alternatives. Other digital options were also considered such as incorporating NFC/Apple pay to create a “touchless” payment experience (Res1, Ret1), improved digital marketing campaigns to drive traffic to the website (Res1, Ret2, Res2) and a mobile app to help customer shop from the convenience of their phone (Ret1, Ret2). Even with these alternative methods, QR code adoption met the most needs of the businesses in helping with customer engagement for in-person traffic.

4.4 Outcomes and adoption of change

Other than interviews, ethnographic research was conducted to gather field data about the adoption of the change to QR codes by customers.

The resulting outcome of the adoption of QR codes was quite significant in all four of the business environments. Customer purchases increased and potential touchpoints were reduced. Figure 13 shows the new “touchless” experience with a customer in a restaurant environment ideated by PA and PD.

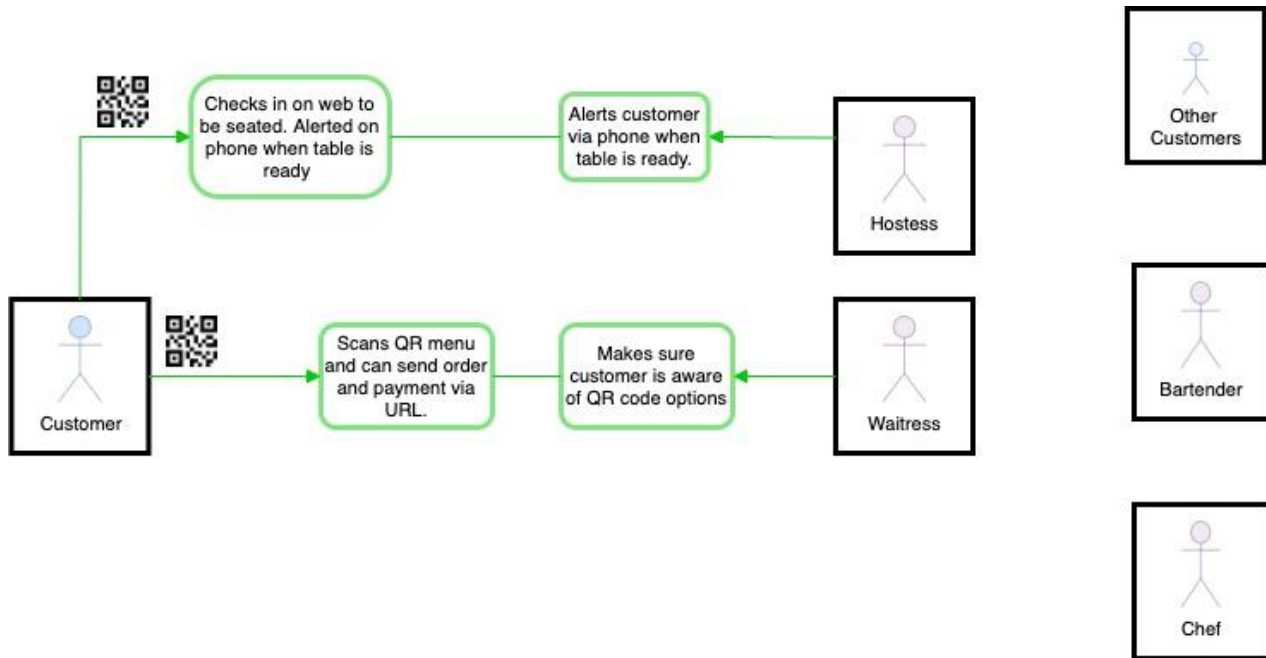


Figure 13: Customer QR touchpoints- restaurant

In this example, the customer checks-in to the restaurant in order to be put on the waitlist to be seated. The customer walked up, used their smartphone to scan the code and was directly to a digital waitlist where they entered their phone number. When the table was available, the hostess was able to see the names on the waitlist and text the next customer that their table was ready. In observation in both Res1 and Res2, a majority of customers utilized this feature with an estimation of 10% continuing to use the hostess to check-in. Once seated, the customer is informed of the menu availability and payment options via QR code by the waitress. Once drinks and food are ordered and the meal is paid for, an option to scan a QR code for feedback is placed on the receipt for the customer to do on their own time. From observations, a majority of customers completed the task of scanning the QR code menu with only a few asking for a physical menu and a few not utilizing either option.

In a retail setting, Figure 14 demonstrates the new customer journey with reduced touchpoints since the adoption of QR codes. This customer journey was ideated by PB and PC.

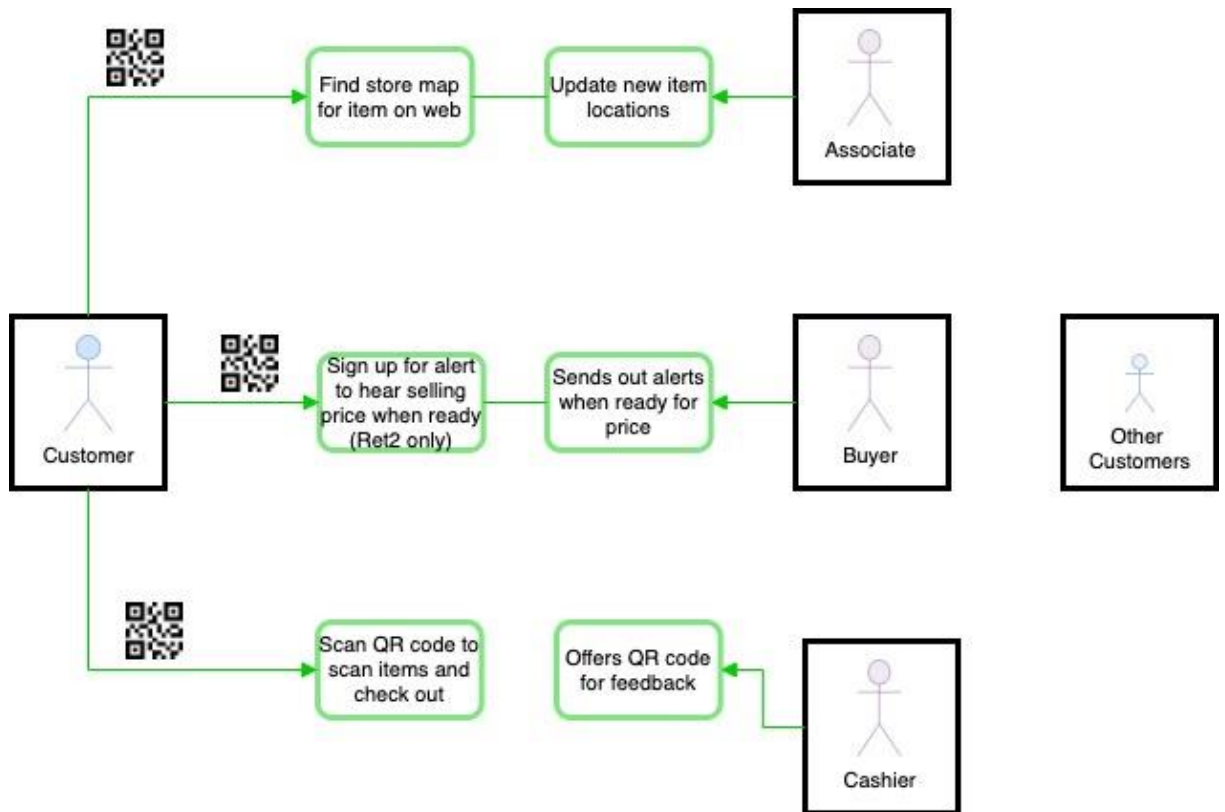


Figure 14: Customer QR touchpoints- retail

In this depiction, a customer scans a QR code in order to find a certain item or item information on the store database. The associate is responsible for updating the item location if it moves for a specific event such as a reorganization or promotional table. The customer is also able to read information about a book they might find interesting to alleviate the need to physically touch it. Once the customer has collected the items they want to purchase, they can scan the QR code to take them to the payment options. After the transaction, a QR code was printed on the receipt to encourage customers to leave feedback. In the case of Ret2, where they were purchasing used books, the customer could sign up to be on an alert list when the store was ready to declare their book price. The buyer would be responsible for alerting the customer that their books were ready after viewing the list.

Overall the businesses were happy with the outcome of the change. Customer engagement improved in all 4 and Ret2 even noticed an increase in online traffic to their website to order books for delivery. The feedback of the staff on the changes was also very positive as they felt it made their workplace safer and reduced the risk of them possibly getting sick from customer interaction.

There were many friction points with the adoption of the QR codes. First, Res1 and Res2 noticed that elderly patrons had issues understanding how to use the QR codes and

instead insisted on physical menus. They also continued to check-in, order and pay without the use of QR codes, which eliminated the “touchless” experience the business owners were aiming for. Another friction point came from customers who were not able to use their mobile or it’s camera function. In order to use a QR code, the user must scan it from their phone’s camera. If the phone is dead, or the camera is broken, they are unable to achieve this task. In addition, external factors, such as lighting and print quality of the QR code affected how well the camera could read the code and therefore direct customers to the correct location. To mitigate these issues, some physical menus were still available, but were only presented upon request.

4.5 Future use

Overall, all four business owners agreed that the adoption of QR codes was advantageous in meeting their goals to enhance customer engagement and reduce touchpoints for the safety of their staff and other customers. Currently, Ret2 is continuing to experiment with use of QR codes for other purposes that further meet customer engagement and safety goals. This includes using a QR code to link to a survey to help recommend different books for their customers. This alleviates the need to ask an associate for recommendation as they will be available online. In addition, Ret2 wanted to look into a complete “contactless” experience with transactions through using the camera to scan the barcode of the book to place into a digital cart and having the customer fill out payment information online.

Both of these options are not currently being used by Ret2 but are in the stages of development to use around the holidays as customer traffic and purchases tend to increase.

Discussion

The discussion section of this thesis reflects on the result of the overall study and cohesively connects earlier research with data collected from the interview answers. This chapter will also conclude with ethical viewpoints, future research topics, reflections of the learning process and reliability in results.

4.6 Consideration of Results

Motivation to adapt

Overall the main motivation to adopt QR codes into the business strategy was to increase safe customer engagement to mitigate the decline in sales caused by the pandemic. Though 3 of the 4 participating businesses already offered a digital alternative in the form of a website, in-person traffic continued to stagger and need arose to offer safe, digital solutions to common physical touchpoints. The first step to customer engagement is informing them of the offerings and deals going on in the store. This was done by granting users access to the menu/catalogue digitally in a public location. Afterwards, making normal transactional interactions easier and safer was the next step in the motivation to adopt QR codes. Staff and customer safety, as well as government mandated restrictions promoted healthier physical environments but did not offer solutions to help businesses adapt with their in-person customers. A digital solution that was easy for the customer to use and cost effective was the ideal solution for the businesses to adopt.

QR codes as the solution

QR codes were the chosen solution due to their familiarity worldwide, their prevalent use cases in other similar sectors and also their cost effectiveness. They also met the needs of customer engagement and safety that the interviewed participants were looking for. In the cases of the restaurant environments, QR codes were utilized to allow customers access to menus- which were previously reused or printed and thrown out causing hygiene and waste concerns. In retail environments, QR codes were adapted to showcase inventory items and item info which was previously done by browsing customers in the stores. In a few cross-sectional cases, payment and feedback actions were conducted using QR codes to begin that process for customers whereas before, those were done with physical interaction and touchpoints by the customers and members of staff.

Friction areas

There were quite a few friction points which arose in the interviews as well as during the ethnographic observations. One was that the demographics for QR codes were mostly younger “digital natives” or users of digital technology who have grown up with it and are easily able to identify technology like QR codes. Elderly patrons had a harder time using QR codes because of their lack of owning a smartphone, inability to scan the code and inability to navigate the website.

Another friction point was the external environment the QR code was located in. Because it requires the customer’s camera to read the code and transfer the user to the correct URL, the success of that action is dependent on how well the camera can read the code. In cases where the room had dim lighting or the customer’s phone camera was not properly working, customers were unable to use QR codes as an option,

4.7 Conclusion

To conclude this thesis, a brief, summarized answer to the research question will be given.

How can businesses adapt their products and services using QR codes to continue customer engagement amidst physical and societal restrictions?

The research and data acquired for this thesis show that business can adapt their products and services in a variety of ways using QR codes. First, by focusing directly on customer engagement and safety of their staff and customers, businesses can convert normal physical touchpoints into “touchless” experiences through the use of QR codes. This includes informing customers of offerings through menu or catalogue access with item info, offering a map of the location to help customers find what they are looking for, having payment options and check-in/reservation options to eliminate physical transactions between employee and customer, and acquiring feedback without direct communication. Though there are some friction points regarding demographic and physical environments, this method proves beneficial for increasing and maintaining customer engagement.

4.8 Ethical Viewpoints

Though these results were applicable amongst the 4 participants, there are other viewpoints that should be considered before promoting this business strategy. For example, the participants interviewed were local business owners in Lexington, Ky. Staff, nor customers were interviewed, therefore results could only be relevant to the business owners' perspective and not others. Also, though there was one example of a business having two locations, they were all small and local and didn't take larger corporate retailers/restaurants into consideration. This could also have different results as they are often more resourced to have digital solutions to reach a broader range of customers in demographics. Finally, these results were relevant for the local restaurant and retail industries but did not take into account other service industries that could be utilizing QR codes as a method to provide services to their customers.

On top of this, time restraints meant that it was not possible to conduct other qualitative methods which would have allowed further solidity of the results, however interview participants were given a copy of this thesis to review for error or miscommunicated data so the author feels the qualitative data was sufficient for a bachelor's degree level thesis.

4.9 Future Research Topics

Due to time constraints, it was not possible to continue research past a bachelor's thesis scope and research question. However, interesting continuation research could occur looking into different business sectors, sizes and environments to see if the research results in similar findings. For example, how are the experiences in larger corporation with more technological resources differing from the results found in this research of smaller, local businesses? After the pandemic, will this trend continue, or will businesses once again resort to physical catalogues/menus?

4.10 Evaluation of Processes and Self-Learning

The thesis process was extremely challenging, yet beneficial. The most difficult part was choosing the topic. With a wide variety of digital research problems existing, narrowing it down to one that met the author's interest and was capable of being researched in such a short timeframe was a challenge. Once the topic was chosen, however, the second difficult part was the time frame. The author working and living in a different geographical location as the advisor and thesis course meant it was challenging to schedule reviews based on the different time zones. However, the flexibility of the advisor and thesis course professor meant it was a lot easier to create a fluid communication.

There were a lot of things learned about the research process and writing of a thesis. Though this is the second thesis the author has written, it was interesting to note that this was the first research-based thesis. Though the author had done research projects in the past, it was interesting to read recommendations from professionals and learn new techniques for collecting qualitative research. It was also interesting to learn how to code qualitative information. The process was not as simple as anticipated and took more hours than expected to complete the code and extrapolate themes. Because of this, it was harder to have official, written work to be reviewed by my peers and advisor.

Looking back, the one thing the author wishes she would have done differently is set more specific weekly goals and better time management goals to run by her advisor. His help was priceless in helping organize the thesis and advise through the process. Unfortunately, time constraints prevented less opportunity for this.

4.11 Reliability of process and results

The reliability of this process was maintained through recommended guidelines from the thesis advisor, BIT thesis course as well as Judith Bell's *Doing Your Research Project* book. These resources proved extremely informative, beneficial and motivational in maintaining the proper project plan blueprint in order to ensure reliability of the process. Though time and geographical restraints limited the researcher, these three resources aided in maintaining and sticking to a proper research plan in order to not compromise the ethics of the research. The reliability of the research collection came from recommendations from Kvale & Brinkmann, Silvermann, DiCicco-Bloom & Crabtree, Burnard, Braun & Clarke, and Agrosino on how to properly conduct qualitative interviews and ethnographic research.

The reliability of the results were validated by contacting the business owners and having them review the thesis conclusions in order to confirm or object the results. All four participants agreed to the results. The quantitative results were validated through using scholarly and recommended sources such as Google Scholar, JSTOR and other resources promoted by the Haaga-Helia library.

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Appendices

Appendix 1: Interview Waiver

Interview Consent Form

Research project title: Touchless UX: Small Business Use of QR Codes during the Covid-19 Pandemic

Research author: Hayley Grant

The interview will take approximately 30 minutes. There are no known risks anticipated with your participation. However you, as the participant, have the right to stop the interview and have all information surrounding your answers withdrawn at any point.

Thank you for your participation in this interview. This form is to explicitly ask for permission to interview you and use the information provided for this research project. Any identifiable features, such as name and business name will be changed to promote confidentiality.

By signing this form you approve the following:

- You allow the interview to be audio recorded and a transcript to be produced.
- You will be given the opportunity to opt-in to receive the transcript and finalized research report to review before publication.
- Access to the transcript and interview information will be limited to Hayley Grant and yourself if you would like to access it.
- Any identifiers will be removed to promote confidentiality.
- The actual audio recording of your interview will be kept for 30 days before being destroyed.

By signing this form, I agree that;

1. I am taking part in this interview voluntarily and that I can stop the interview at any time.
2. The information gathered can be used in the research project listed above as long as confidentiality measures are in place.
3. I have read this sheet.
4. I don't expect any compensation for my participation.
5. I can request the audio recording (up to the day it is destroyed) or a copy of the transcript to review.
6. I have been able to ask clarification questions and am free to contact the researcher for any future questions.

Appendix 2: Interview Participants

Interview Alias	Business Alias	Gender	Waiver Signed	Interview Conducted (Date)
Participant 1	Restaurant 1	F	X	14 October 2020
Participant 2	Retail 1	F	X	16 October 2020
Participant 3	Retail 2	M	X	20 October 2020
Participant 4	Restaurant 2	M	X	27 October 2020

Appendix 3: Interview Questions

1. Can you tell me about yourself and your business?
 - a. Your background, current role and responsibilities?
 - b. What sector/retail is it in?
 - c. How long have you been in business?
2. Before the pandemic, what digital technology was used to meet customer needs?
3. How has the pandemic affected your business?
 - a. Did you temporarily have to close?
 - b. What changes did you have to make to accommodate local ordinances?

What immediate actions had to take place when ordinances were put in place for non-essential businesses? What does it mean to be “non-essential”? How has this affected the businesses yearly strategy? How much of an impact did this have?

4. In what ways have you had to adapt to meet customer needs?
 - a. Are you able to offer the same services you did before the pandemic?

How digital was the business before the pandemic? What unforeseen changes had to happen in order to comply with local ordinances? What options and solutions were discussed and attempted?

5. What was the process to make the decision to use QR codes to help with business needs?

Why was QR code chosen over other possible connection methods? What was the process of creating the QR codes for the business? Was the transition 100% of your offerings or were they certain products/services that had to be excluded?

6. How were they created for your business?
 - a. Were 100% of your products/services available through QR code or did you have to exclude some?
7. How did your customers and employees react to this change?

What difficulties did the business and their customers face? Was this a more convenient method to deliver services? Could this be a new method of product/service delivery after the pandemic?

8. What pain points and positives did you see coming out of this use of QR codes?
9. Could this be a method you continue to use, after the pandemic ends?