

Thesis Portfolio

Product Discovery in Artisanal Retail

(Technical Report)

Analysis of the Role of Technology in the Transformation of Artisanal Retail
(STS Research Paper)

An Undergraduate Thesis

Presented to the Faculty of the School of Engineering and Applied Science
University of Virginia • Charlottesville, Virginia

In Fulfillment of the Requirements for the Degree
Bachelor of Science, School of Engineering

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Spring, 2021

Department of Computer Science

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A Research Paper submitted to the Department of Engineering and Society

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On my honor as a University Student, I have neither given nor received
unauthorized aid on this assignment as defined by the Honor Guidelines
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Approved _____ Date _____
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Analysis of the Role of Technology in the Transformation of Artisanal Retail

Introduction

During the start of the COVID-19 pandemic, one issue that caught my interest on retail and restaurant industry. All around me, stores and restaurants were struggling to survive, especially small brick and mortar stores. One of my favorite activities is visiting unique brick and mortar stores, flea markets, and artisan fairs. This past semester, I visited a pop-up artisan fair in Richmond where I was able to interview both small retail stores that had booths and artisans. I learned from my interviews how many physical businesses had to create an online presence during the pandemic and how artisans selling online were able to maintain businesses.

For my STS Research, I am studying the revitalization of the physical retail industry and the role technology plays in this transformation. I am also studying what technology is being applied from the innovation within the online shopping industry to transforming the physical shopping experience. For my research, I plan to interview more retailers and shoppers this semester through both surveys and phone/in person interviews. I previously conducted surveying by sending out a Google Form survey to both shoppers and retailers. In addition to surveying and interviewing analyzing additional research journals to better understand technology innovations in the retail industry. An additional goal is to find retailers who are early adopters of future retail technology and gain insights from either interviewing or surveying. This research would require initial research into small businesses and large retailers that have adopted technology. I also plan to specifically see technological advancements as a result of COVID such as face temperature scanners or the implementation of automation to limit human contact during the pandemic.

Literature Review

The physical retail industry and the ecommerce industry are often seen as separate competing industries. Ecommerce is also seen as growing at the expense of online retail; however, this relationship is more mutually beneficial. Physical retailers are adopting technologies and innovations from online retailers to revitalize the physical shopping experience and online retailers are finding that opening a physical store is increasing their overall sales. This topic is especially important currently as the COVID-19 pandemic is negatively impacting physical retailers and brick and mortar stores. Many retailers are struggling to stay in business due to social distancing laws and consumers are relying on ecommerce. While research extensively described the technological innovations in the physical retail space and the changing dynamics of retail channels, there is relatively limited research on potentially negative impacts of this future of retail. While online retailers have faced significant scrutiny for collecting and using customer data, it is hard to predict whether physical retailers will learn from the mistakes of online retailers and their use of technology or also face similar challenges in the future.

While ecommerce has been innovating at a rapid pace since the adoption of online shopping, the physical shopping experience has stayed relatively the same. However, in the past few years physical retailers have realized that they need to revitalize the shopping experience. Various studies show how physical retailers are adopting e commerce innovations to use technology to improve the customer experience. One study in the “Future of Retailing” journal, Technologies Turning Future Brick-and-Mortar Stores into Data-Rich Environments, describes a future of retail where consumer data is collected using cameras, sensors, and software such as facial recognition to process this data. This study describes how online retailers track each consumer click and interaction which has created an “information advantage” over physical

stores. In the picture painted by this study, the struggle of physical retailers has been primarily caused by “the age of anonymous shopper” which has prevented physical retailers from profiting off of consumer data. While the study accurately describes the technology-based future of the retail industry, it presents a narrow view of the problem. One real example of this future is Amazon Go stores. Amazon Go stores automate the grocery experience using various technologies such as computer vision, deep learning, and weight and motion sensors. (Blake, 2019). While Amazon stores are very similar to the reality described by the *Future of Retailing Journal*, Amazon is working towards achieving a unified ecommerce and physical shopping experience, known as an omni-channel retail experience.

While the future of physical retail is technology based, the future of the retail industry combines this innovation with a shift towards a single channel experience rather than consumers having the option of either a physical store or website to shop from. Various research studies describe the concept of an “omni-channel” retail experience, where “where all data is shared among and between channels, the customer can buy in one channel and return in another one. The offering and service are consistent through all channels”. (Eliasson, 2018). According to a study by the *International Journal Electronic Commerce*, a traditional retail store would serve as a hub which would integrate all channels of potential sales. In this concept, customers would be able to move effortlessly between physical and online channels and physical stores would be in the center of this omni-channel. The main problem this study describes is that currently retailers view ecommerce and physical retail as separate. (Piotrowicz, 2014). However, this study was written in 2014, and since then a certain degree of omni-channel retail has been achieved by large retailers. According to a study in the *Social Science Research Network*, many brands have tested this concept using a “Zero Inventory Store” (ZIO), a small footprint, experience-centric

retail location which carries no inventory for immediate fulfillment but fulfills orders via e-commerce. The study found that when shopping on ecommerce at a ZIO, customers spend more and more frequently. The ZIS store also provides additional product discovery and brand attachment, providing further benefit to the online retailer. These ZIS stores show retail stores as “hubs” described can actually help online retailers achieve an omni-channel retail experience rather than just an online experience. (Bell, 2018). Walmart is a clear example of a brick and mortar business expanding into e-commerce and successfully implementing a single channel retail experience. (L,2015)

While the retail industry has been undergoing a transformation for a while, the current COVID-19 pandemic has caused major unexpected changes in the retail industry. A combination of restrictions on indoor activities and social distancing and a recession, many physical retailers, especially small brick and mortar stores, are struggling to survive. Surprisingly, the pandemic is actually accelerating some innovation in physical retail. A Harvard Business Review study, a future of contactless shopping which has already been trialed in the past. A future of contactless shopping would require a more immersive technology-based experience. (Machtiger, 2020). Looking at the current research on the relationship between physical retailers and ecommerce retailers, it is clear that there is a wide and diverse network of relationships across the retail industry. Technology has shifted retail toward a new unified shopping experience where online and physical retail is interconnected. This research shows how currently technology plays a significant role in physical retail, but current innovators are mostly comprised of large physical retailers such as Walmart, Amazon, and Costco. To further this research, this project would study adapting technology in smaller brick and mortar stores to research the impact of our Capstone project.

Current research describes the use of technology in larger retailers, but there has been significantly less research on brick-and-mortar stores and independent artisans. Through my STS research, my goal was to further the current research by learning what technologies smaller retail stores and small-scale creators have adopted. Many artisans have purely online businesses through websites or ecommerce platforms such as Etsy and leverage technology tools such as digital advertising and data analytics. One of the focuses of my research is to analyze small business and artisans adopting technology specifically due to the COVID-19 pandemic. Another recent trend that current research does not address is creators becoming their own sellers, essentially starting their own businesses and selling directly to consumers. To further organize the relationships presented by the current research, the Actor-network theory was used to establish a heterogeneous actant network. This trend has led to a heterogeneous actant network between creators and businesses.

STS Framework/Research Method

To identify the heterogeneous actant network in my research, first the actants have to be identified and described. My research topic involves analyzing the relationship between physical brick and mortar stores and online shopping and how technological innovation from online shopping is now being applied to the comeback of physical stores. The human actants within this network include the retail workers, physical store owners, customers, and all types of employees for large online retailers. Non-human actants are composed of technology that has created online shopping and is now helping physical shopping grow and the products the retail industry is based around. One heterogeneous actant network within my research is the relationship between retailers (NH), technology (NH), and customers. To add clarity to this network with an example, one example of this network is a physical clothing store, checkout free technology, and

customers visiting the store. For the customers, this technology provides convenience and saves time and for the retailers provides more revenue as the store is able to support more customers and provides customers a better shopping experience. Other instances of shopping technology such as AI based recommendations provided via phone provides the customer with a personalization shopping experience and convenience as the AI is able to predict the customers interests and needs. The products that physical and online retailers carry can also be added as a non-human actant to this network as they are the basis of the entire shopping experience.

Technology eases the effort required for a customer to obtain a product they need or want and also help retailers sell products that customers did not necessarily realize they wanted. The main relationship in this network is the relationship between physical and online retailers (NH) and customers (H) is a classic trade situation with technology (NH) serving the purpose of facilitating exchange and growth between these two main actants.

In order to form this actant network, the actants have gone through various translations. One of the main focuses of my research is how the physical shopping industry is revitalizing itself through technology and other methods. Prior to this transformation, the network between physical retailers (NH) and customers (H) almost broke down to a downward trend of sales which can be seen as a connection between these two actants. During this time frame, online retailers (NH) and customers (H) were forming a stronger network as more and more customers were increasingly shopping online. Recently, a more connected network has formed that involves both online and physical retailers. Large and small retailers have realized that they need an online presence to succeed in the current state of the retail industry and have also realized that the typical physical shopping experience needs to change to draw customers back. This heterogeneous actant network can be used to explain the construction of technology and society

in my research. One example is consumer data collection and analysis of this data to gain customer insights. The construction of this field has been directly caused by this actant network as online retailers have needed new and more personalized ways to draw consumers within the vast sea of retailers across the internet.

Data Analysis

Through my data collection, I was able to gain many insights on technology use in small and medium sized retail businesses. First, through our Capstone project we conducted retailer surveys to gain general insights on business trends across 150+ creators/small businesses that were surveyed. Through these surveys, we learned that these creators operate as small businesses. For creators and small businesses, the surveys showed insights on how these artisans/creators are currently selling their products. These surveys showed the trend of creators also becoming small online businesses as most surveyed creators sell on social media and half of the survey creators use a personal website as their online business.

Platforms used to sell

- 85.8% sell on social media
- 50% Shopify/personal website
- 45.3% sell on Etsy

In addition to surveying as part of the Capstone project, I conducted 10 small business and creator interviews this semester by visiting brick and mortar stores and an artisan fair in Richmond, Virginia. In the past, there was a clear division of labor between small businesses

and creators; small businesses were exclusively resellers of products made by creators/artisans. This relationship still exists as the businesses model for many of these small brick and mortar stores still focuses on sourcing individual creators to create unique inventory. One store in visited in downtown Staunton Virginia, “Made; by the people, for the people”, primary resold artisan made products from around the country. The five artisan brick and mortar stores that were interviewed were all resellers of artisan made products. However, through surveying and interviewing artisans at the artisan fair, artisans now form their own small businesses. Online ecommerce platforms offer a much smaller barrier of entry allowing at home creators to sell products. A common trend amongst creators was starting their businesses on Etsy and then transitioning to a personal website to create their own online presence. This is due the high fees Etsy charges and it is harder for creators to establish a brand amongst countless other creators on platforms such as Etsy.

Part of the interviews focused on questions regarding impact of the pandemic of business processes which showed trends across small businesses. Prior to the pandemic, five out of the ten interviewed small businesses had no online presence and based their businesses solely off local foot traffic. Four businesses had just information websites to show hours and descriptions of their businesses but were not actually selling products. Only one small business had an active one marketplace where they were also selling products prior to the pandemic. Through an interview of an artisan-based gift shop I found that to survive temporally closing their shop, the business adopted an online marketplace. This online presence allowed them to stay in business and actually expand their range of their customers beyond in person visitors.

Through small business interviews, I also found that many small businesses have adopted online ecommerce platforms to sell their products online. Contactless payment methods have

expedited the process for buying products and goods and range from checking out on our phone while in store to contactless credit cards. Technology in e commerce has been much more accessible to small businesses and many small businesses have reported using tools such as SEO Optimization, Online Ads, Recommendations and other online data analysis tools to supplement their businesses.

Discussion/Conclusion

Through my research, I found that many small businesses and retailers have adopted retail technology. For example, many restaurants have implemented contact less QR code-based menus due to the COVID-19 pandemic. Many retailers and businesses have also adopted contactless mobile based payment to reduce labor and human contact. Many of these technological advancements will have wide benefits after the COVID-19 pandemic as efficiency is increased through these tools. In my STS Frameworks in the Prospectus and Thesis, the relationships between actors and individuals in the retail businesses are clearly established and described. In the past, there was a clear division between retail businesses and creators as businesses sold the inventory provided by the artisans. However, in the past decade, there has been a trend of creators establishing themselves as small businesses to sell their own products due to much smaller entry barrier. Ecommerce marketplaces such as Etsy provide an easy and seamless way for a creator to quickly start selling their products. There has also been a trend of smaller retailer businesses adopting ecommerce business to supplement their physical sales. This was accelerated during the pandemic as many stores needed to establish an online marketplace while stores were temporarily closed. Many of trends found from the data collection have been furthered by the pandemic. One future research topic would be to revisit these findings post

pandemic to research how permanent the trends are. A second surveying round to reconnect with businesses and creators in the future would show the significance of the effect of COVID-19 on the retail and artisan industries. Another interesting research topic would be to analyze future shopping trends post pandemic. More than a year of quarantine and restrictions have led to additional savings for many Americans and an urge to travel which may lead to more in person spending.

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