QUANTIFYING CUSTOMER EXPERIENCE

The DART Group details how the Process, Layout, Metrics Model helps retailers quantify customer experience

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Retailers can no longer focus on simply getting a product to the customer. Even before the COVID-19 pandemic, brick-and-mortar retailers struggled with how to compete with the digital retail experience. Shopping online allows customers to skip crowds, long lines, and arguments at the checkout. To compete, the brick-and-mortar shopping experience must be worth the time and effort to leave the house and make the trek to the store.

Technologies such as RFID are key to inventory management. However, keeping the shelves full and knowing where everything is located becomes only part of creating this experience. Many other technologies are applied to take the shopping experience beyond the simple baseline toward something that resembles an immersive entertainment experience. AREA15 in Las Vegas is the epitome of such experiential retail, but not every retailer needs to go that far to create an experience worth shopping for. We see many of our partners embracing "Frictionless Checkout" technologies. Computer Vision (CV) and Radar technologies have enabled "Gesture Recognition," where shoppers no longer need to come in contact with touchscreens or keypads. Simple hand gestures are all that is required to enter data into a checkout terminal. In addition, CV with Machine Learning (ML) and Artificial Intelligence (AI) algorithms can identify the product being purchased. The fusion of sensor data from CV, RFID, Infrared (IR), and weight scales can not only accurately identify the product but can also identify customer cheating and theft.

In the future, these same CV, ML, and AI technologies can be used to create enhanced shopping experiences using Augmented Reality (AR) and Mixed Reality (MR). Imagine walking down the store aisle viewing additional product information on your smartphone while pointing your camera. There are even 3D rendering apps that allow the customer to place a product in their home without ever leaving the store. Smart Fitting Rooms are another technology made popular by the COVID-19 pandemic. The use of CV, AI, and ML give shoppers the ability to "virtually" try on clothes and return home with the perfect size and color the first time.

Online retailers use cookies, button clicks, page views, and redirections to analyze and identify shopper behaviors such as which products are bestsellers, which products tend to be sold together, and which products are looked at but never purchased. CV, AI, and ML technologies offer the brick-and-mortar retailers the chance to collect these same statistics and more. Retail Analytics companies such as VSBLTY offer some amazing tools to collect real-time statistics on people count, product interaction, dwell time (how long someone looks at an item before buying or not buying it), demographics (age/gender/race), and emotion (happy/sad/disinterested). These statistics are necessary for the brick-and-mortar retailer to optimize that in-store experience.

Successful brick-and-mortar stores of the future must consider more than just convenience; it's about the experience. Today's technology enables retailers to provide an experience even more fulfilling than online shopping.

EXECUTIVE SUMMARY

Quantifying brick-and-mortar customer experience has been a challenge daunting retailers and brands alike. Recognizing this, The DART Group has developed a toolset that quantifies customer experience and observes alterations of consumer behavior when integrated technology solutions are implemented. By visiting brick and mortar stores, evaluating aspects of customer experience, and constructing a *Process*, *Layout*, and *Metric* (PLM) Model, the identified knowledge gap for a retailer can be closed. The PLM Model shows in-store *processes* with correlating *layouts*. These layouts show physical changes used to enhance customer experience, ultimately addressing *metrics* desired by the retailer.

WHO IS THE DART GROUP?

Much like a dart is used in fashion to tailor a garment to be more flattering on an individual's body, The DART Group's mission is to tailor technology integration to make it most effective for various retailers. DART aims to close the knowledge gap and identify solutions to yield higher brand involvement by:

Determining the present

Acknowledging friction

Recognizing opportunities

Tailoring solutions

CUSTOMER EXPERIENCE

Customer experience is frequently the top priority for retailers and brands alike. Customer experience is an outcome of a brand's digital strategy, in-store experience, social media, and omnichannel engagement. All of these contribute to the overall perception of a brand, either aiding in retention or resulting in churn. Our team focuses on in-store experience and the respective touchpoints in a brick-and-mortar setting.

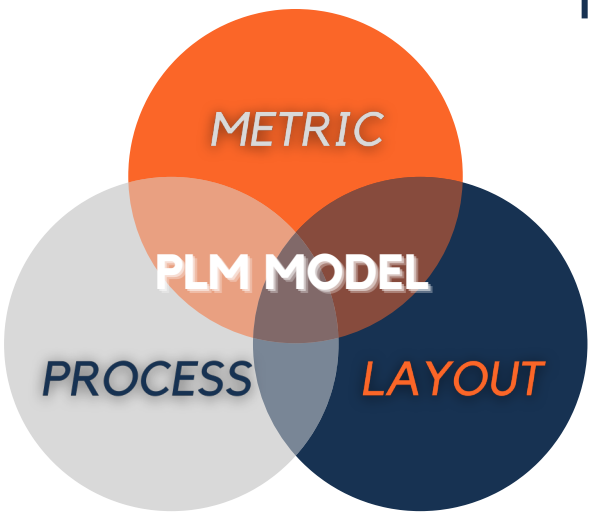
Retailers and brands have access to big data analytics to understand customer engagement in digital spaces, such as where they are providing a positive online customer experience and where they are lacking. Leveraging technology to evaluate the digital customer experience has proven to be incredibly valuable across the industry. However, measuring brick-and-mortar customer experience has been much scanter largely due to the lack of knowledge on how to quantify customers' in-store experience for objective and efficient assessments and comparisons. This presents The DART Group an opportunity to develop a toolset to innovate how retailers measure their in-store customer experience.

THE PROBLEM

As e-commerce established itself as a contender within the retail industry, headlines such as "Retail is Dead" and "The End of Brick-and-Mortar'' plagued media outlets [1]. However, these assumptions of in-store shopping being obsolete are misleading.

Surprisingly, Gen Z prefers to shop in-store versus online. As their spending power continually increases, this generation constituted 40% of global consumers in 2020 [2]. Parallel to this increase, there is a rise of digitally native brands investing in brick-and-mortar locations- Amazon, Allbirds, Fabletics, and Warby Parker, to name a few. This expansion emphasizes the relevance of in-store shopping. Additionally, brick-and-mortar is the preferred format of Baby Boomers, America's wealthiest generation [3]. Brick-and-mortar should be a central tenet of a brand's operational strategy if aiming to capture the spending from one or both of these generations. Brands need a comprehensive understanding of what these generations want to then implement processes that meet their demands. False demand perception leads to a disconnect between the retailer and its target market according to the well-known Gaps Model (Appendix 1, [4]). In our work, we strive to close the Knowledge Gap, which is the difference between customer expectations and management's perception of those expectations.

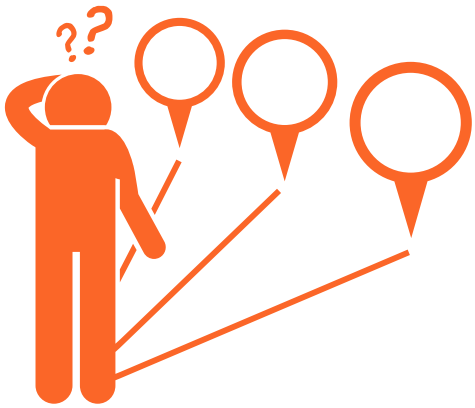
PROJECT OVERVIEW



The DART Group developed the *Process, Layout, Metric* (PLM) Model that engages both retailers and customers, determining practical steps to improve the retail experience for all. Our model diminishes the Knowledge Gap by thoroughly surveying the current in-store experience, gaining insight into current customers, providing feedback to retailers, and then taking actions that better serve customers through the implementation of technology.

When quantifying the customer experience, a *process flow* is developed to further understand the decisions a customer is making in the physical store. Next, we construct a *layout* to track these decisions. Finally, *metrics* for improvement can be drawn. Each step in the PLM model is broken down further in the following pages.

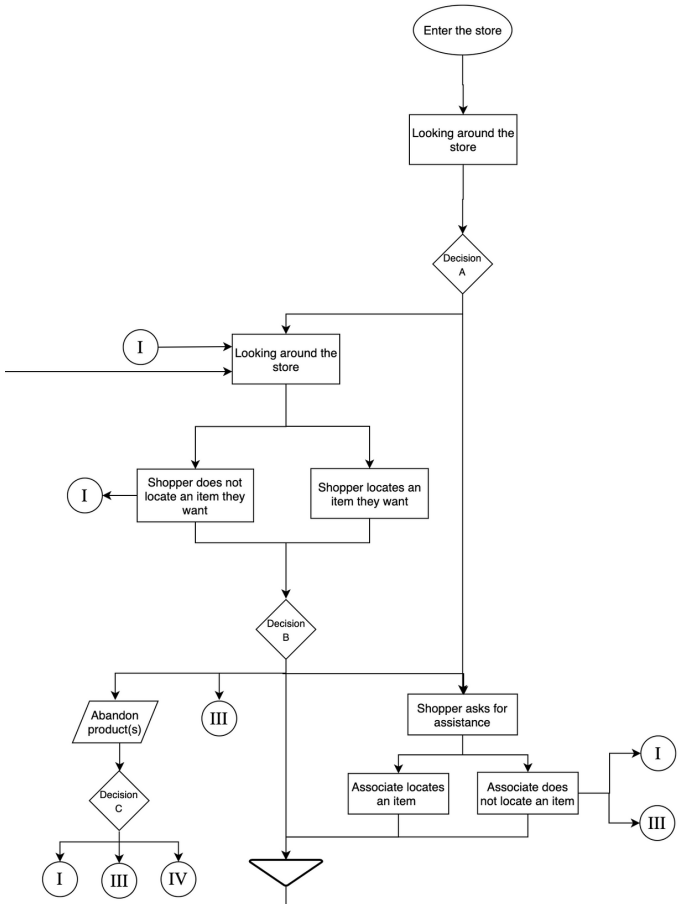
PROCESS



We use process flow diagrams to outline the decisions and subsequent actions a customer takes while in-store. Customer decisions include choosing to abandon a product, asking for assistance, selecting a different size/color/style, etc. Subsequent actions include looking around the store, locating the desired item, walking to checkout, etc. When collaborating with partners, The DART Group aims to capture all decisions and subsequent actions specific to their retail model.

Naturally, decisions and actions vary among retailers, but at the core of all process flows is a look, find, buy feedback loop [5]. This is a constant cycle for all customers serving as the foundation of our process flow construction. In our model, look, find, buy is represented as "looking around the store," "shopper locates item," and "shopper collects item" respectively.

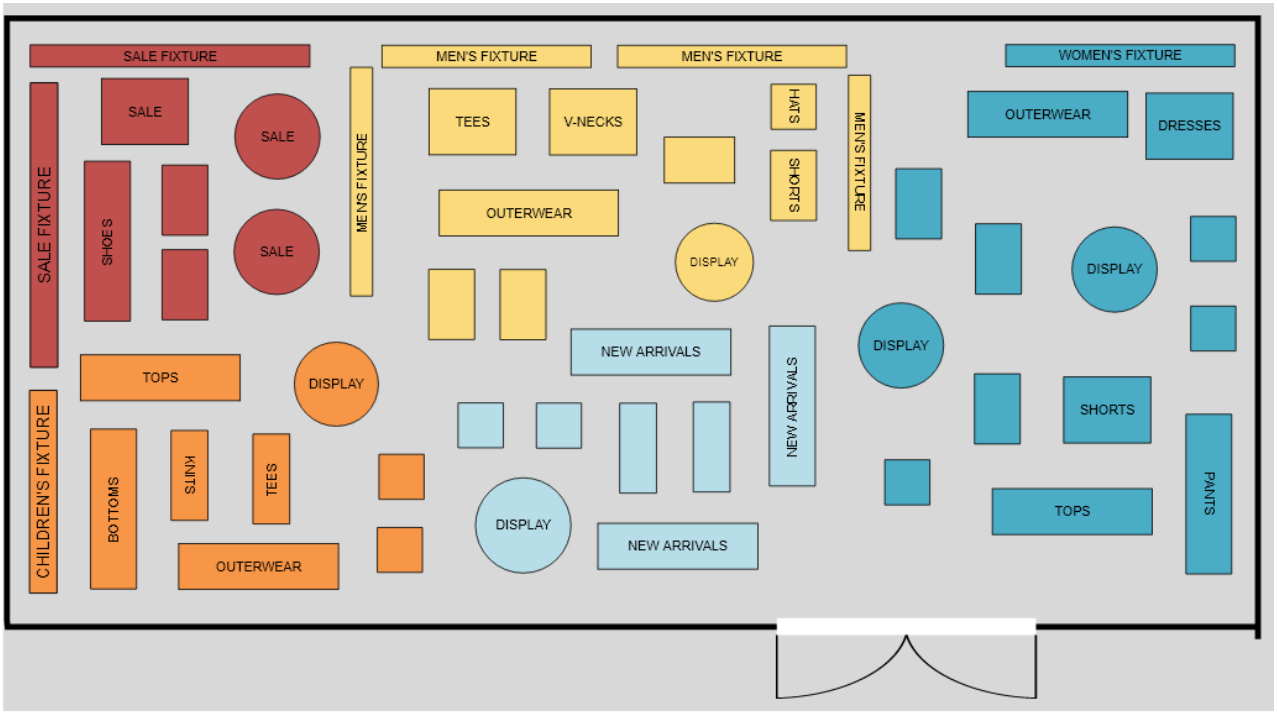
EXAMPLE SECTION OF PROCESS FLOW:



LAYOUT

Layouts, the next piece of the model, reflect the physical retail space and are an estimate of each brick-and-mortar store. Layouts act as a general guide rather than a detailed map and point to the physical location in which the decisions in the process flow are being made. This allows us to understand customer movement during their shopping experience. The layout below shows a general clothing store nonspecific to any one retailer, but rather, is an example of layouts DART produces.

EXAMPLE LAYOUT:



METRICS

The last piece of the PLM Model involves identifying metrics for improvement. Metrics are quantifiable measurements that track changes in a particular business process. These changes will be driven by the implementation of an integrated technology solution or other strategy deemed necessary. When a company adopts our proposed solution, we expect positive change. There is an infinite number of areas a company could seek to improve; however, the most prominent are customer satisfaction, customer loyalty/retention/churn, brand advocacy/reputation, brand quality/operations, and employee engagement [6].

EXAMPLE OF DETERMINED METRICS:

Time In-Store

ΔT = - 17% (-5 mins out of avg. 30 mins in store)

Product Knowledge

ΔP = 2 (digital signage upon entrance, smartphone notifications)

Omni-channel Operations

ΔO = 2 (BOPIS, Ship-From-Store)

Once The DART Group collaboratively determines metrics with retail partners, the process flow is analyzed to determine which steps are impacted as a result of new technologies. By focusing on creating change regarding metrics, there will likely be changes in the frequency of engagement at decision points and subsequent actions. A common question is how the metrics retail to return on investment (ROI). This will be addressed in the Opportunities section- page 19.

APPLICATIONS

Applications for the PLM Model include manual and automated simulations. Manually, we pair decisions made in a process flow to a physical location in a layout, thus showing the link between decisions a customer makes and their movement throughout the store. By running randomized simulations, areas in the process flow that lead to insufficient or invalid outcomes were detected and corrected. This simulation study built confidence in our predictive capabilities and confirmed sufficient depth and breadth of decision point offerings.

Once the validity of the process flow is established, manual simulations are run to mimic potential customer journeys. If we are able to obtain store data, customer actions are weighted to reflect common shopping patterns for that retailer. If store data is not available, actions following a decision are weighted with an even probability. More accurately weighted probabilities will help us build a model for the most probable customer journeys for a specific retailer, with which we can predict the probabilities after introducing an intervention, such as an integration of technology into the store, to understand its impact on the desired metrics

A coded simulation model is our next venture as a team in collaboration with the Auburn University RFID Lab Automation Team. The goal is to feed the simulation a store layout, process flow, sales data, product item files, and product location to curate a market basket. The coded simulation enables the change of weighted percentages with more efficiency and the ability to personalize the model to partners on an as-needed basis.

CASE STUDY

Valuable application for the PLM Model lies in retailers on the edge of innovation. Whether the retailer has already experimented with technological innovation or is looking to start, The DART Group looks at current customer process flows and analyzes where adjustments could be made to shift customer perception from viewing stores as traditional to modern.

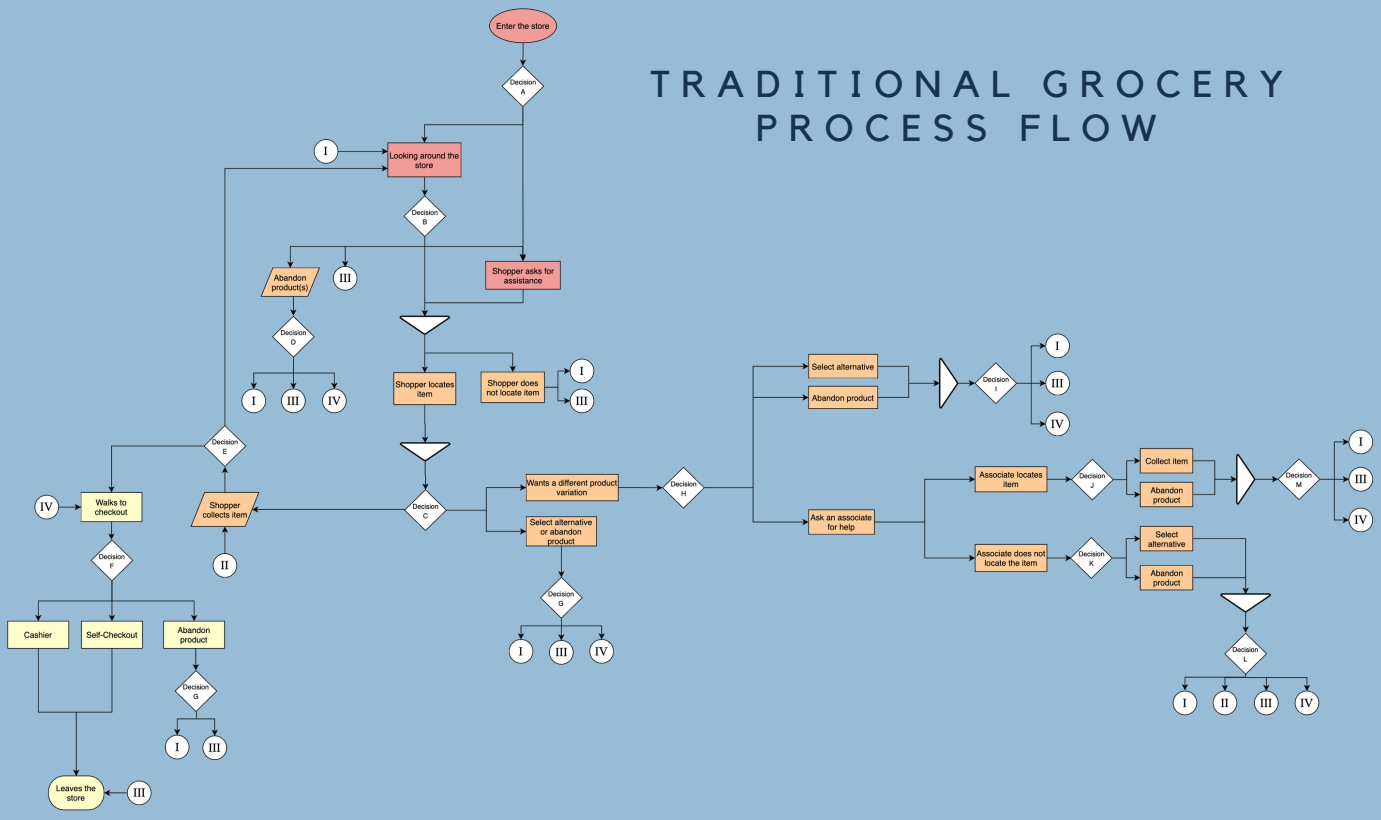
As observed with Amazon Go Grocery, which utilizes Just Walk Out technology, a retailer can make a change that causes a perception shift. From the customer process perspective, only two changes are happening in the Just Walk Out store: customers scan a QR code upon entry and simply walk out with their purchases instead of visiting a POS system.

While there is a technological overhaul that includes product scales, facial recognition, biometrics, RFID, and cameras, customers do not recognize the depth of this processing. Rightfully so, customers focus on their experience, not the heavy technological integration that makes their experience possible.

PROCESS

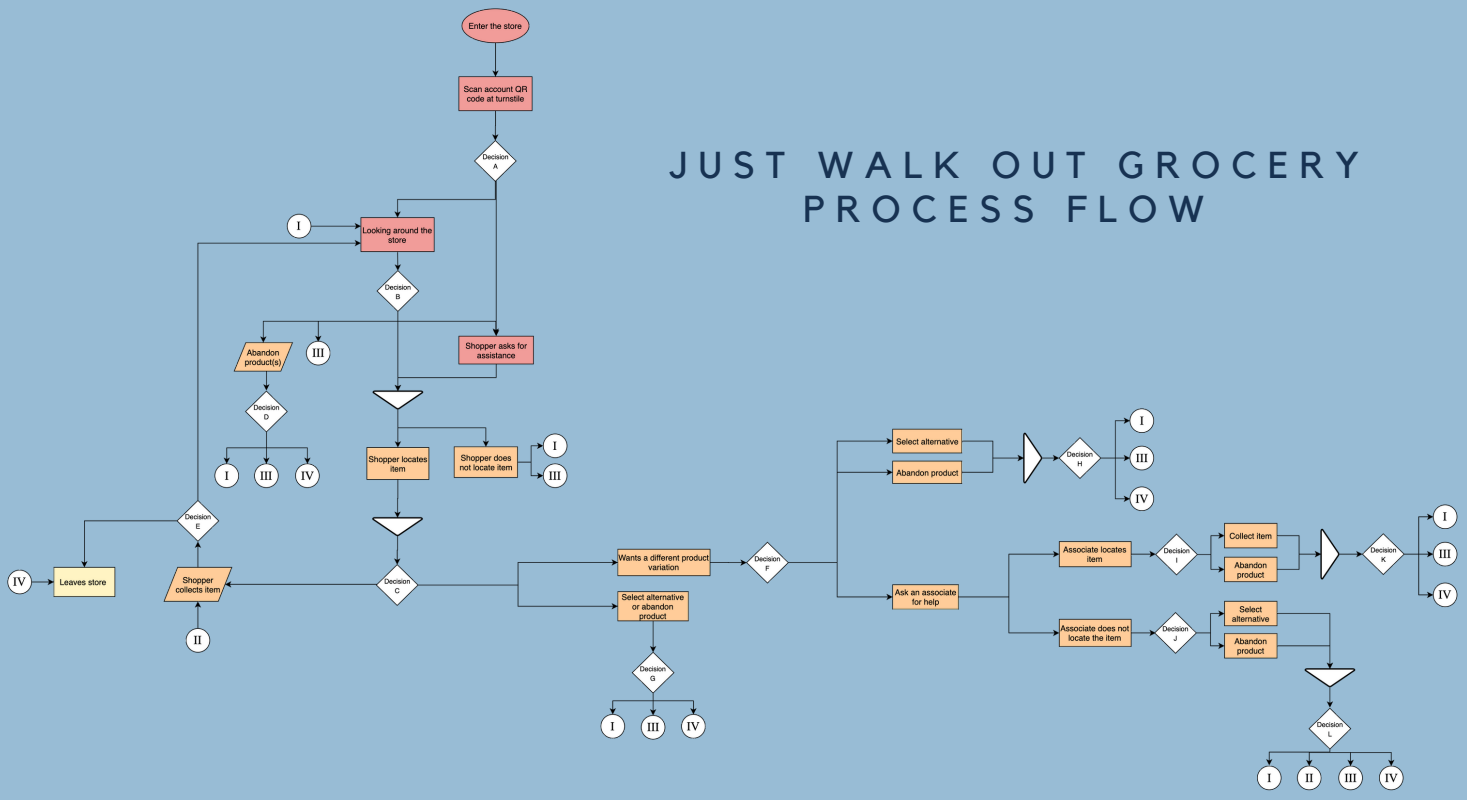
Differences in the customer journey for traditional and Just Walk Out stores are detailed in the following process flows. As demonstrated, "scan account QR code at turnstile" adds one additional step, but in turn, customers subtract several steps in their exit process, resulting in net time saved. For a larger view of differences in process, please visit Appendix 2 on page 24.

TRADITIONAL GROCERY PROCESS FLOW



*Larger image of Traditional Grocery Process Flow can be found in Appendix 3 on page 27.

JUST WALK OUT GROCERY PROCESS FLOW



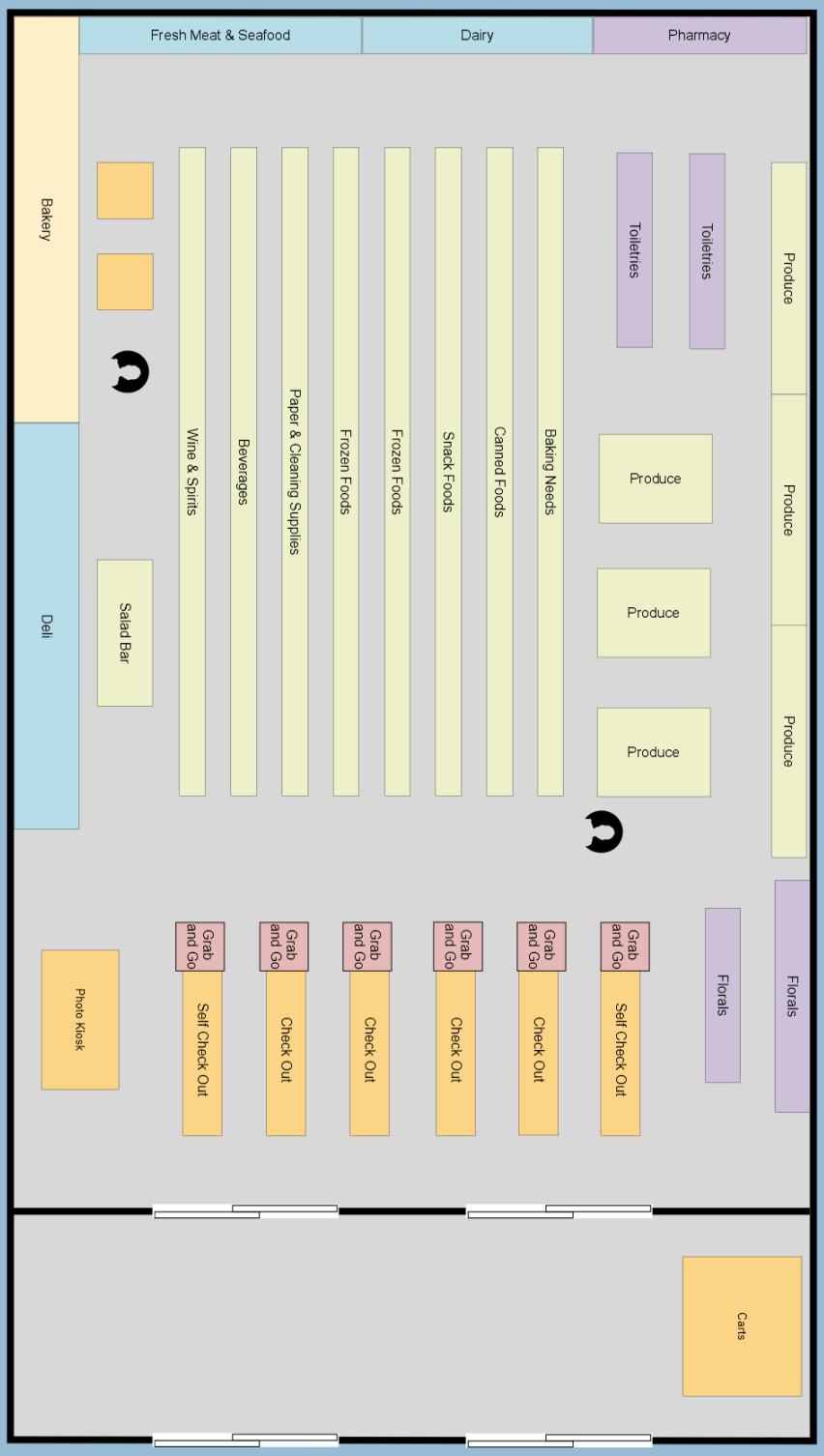
*This process flow is created by The DART Group based on academic observation. Not created or produced in conjunction with Amazon.

*Larger image of Just Walk Out Grocery Process Flow can be found in Appendix 4 on page 28.

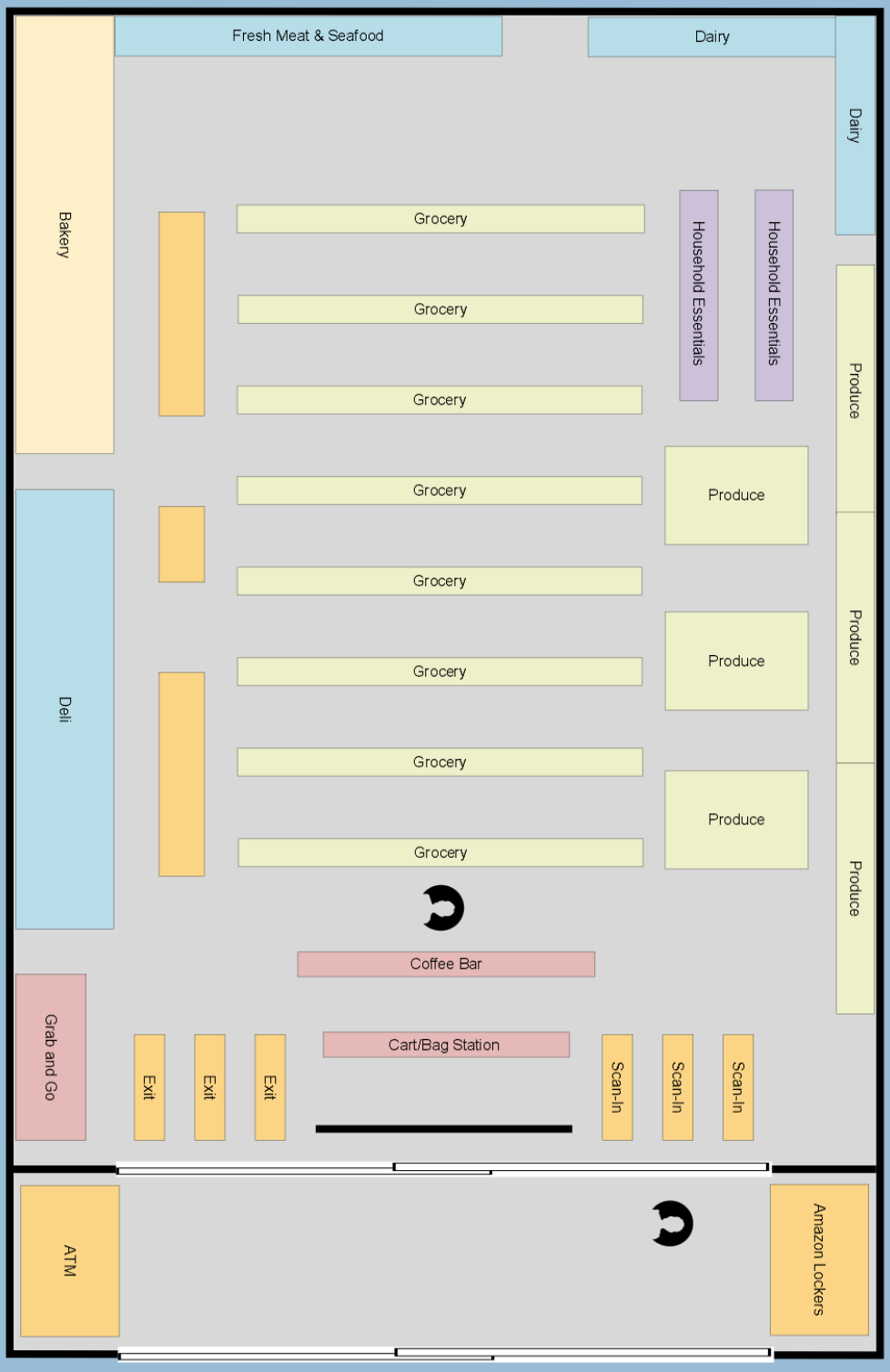
LAYOUT

Amazon Go Grocery's layout is nearly identical to other compact grocery stores, except for alterations to the entrance and lack of POS systems. The collection of customer information by the turnstile in combination with monitoring customer movement allows for the removal of POS systems.

TRADITIONAL GROCERY LAYOUT



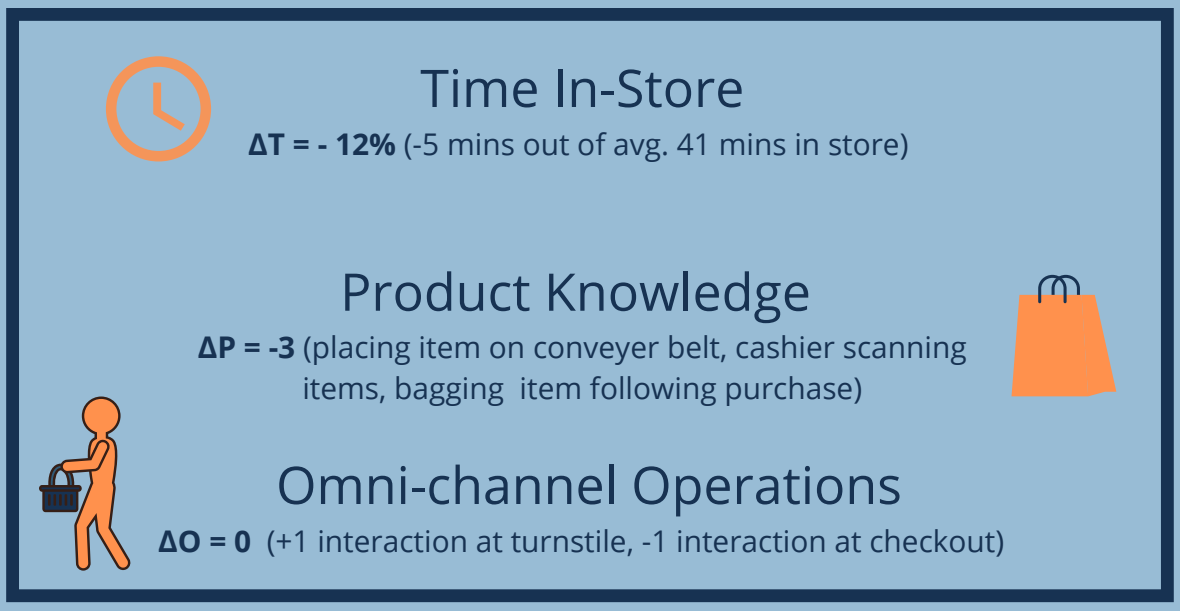
JUST WALK OUT GROCERY LAYOUT



*This layout is created by The DART Group based on academic observation. Not created or produced in conjunction with Amazon.

METRICS

Based on observed outcomes of the Just Walk Out store, The DART Group pinpointed three metrics: customer time in-store, product handling, and customer independence. While we recognize there could be other metrics besides those previously stated, The DART Group narrowed the possibilities down to three for this case study. The model decreases time in-store by eliminating the checkout process, resulting in greater efficiency. The average checkout time is about five minutes of the average grocery trip total of 41 minutes [7, 8]. By eliminating the checkout process, there is approximately a 12% reduction in time in-store. Likewise, product handling is also more efficient. Just Walk Out enables a reduction of three product touchpoints: placing items on the conveyor belt, cashier scanning items, and bagging item(s) following purchase. If a customer utilizes self-checkout the touchpoints eliminated are: self-scanning items, employee interception upon kiosk prompting, and bagging items-post purchase. The last metric researched is customer independence. We found there is no net change in customer independence as Just Walk Out technology adds the step of scanning a QR code upon entry and eliminates the checkout process in the end. While there is no actual change, we found that customers still feel more independent and autonomous.



CASE STUDY CONCLUSION

Through The DART Group's application of the PLM Model, we have discovered retailers often think about innovation through what is perceived as operationally possible first, and then push the boundaries for brick-and-mortar innovation. We infer Amazon reversed this process, first delineating how to create an experience customers desire, followed by technological development to make it happen. As a result, Amazon Go Grocery has seen great success. If brands reverse their thought process to put customer experience first, then think operationally, innovations could be more audacious and future-oriented.

METRICS AND ROI

The DART Group recognizes the importance of converting the PLM Model to a positive ROI. Analysis is done by selecting quantifiable metrics, reviewing the changes in performance, then offsetting the cost of technology. Rarely does ROI come from a single metric. Multiple metrics contribute, which can be more deeply understood with the help of a retailer's finance team. The case study above is a rather extreme example, and it is not always necessary or appropriate to fully automate a store. There is no one-size-fits-all solution to selecting metrics that result in a positive ROI.

OPPORTUNITIES

The PLM Model has many opportunities for academic and retail industry advancements. We are creating an objective, academic process by which retailers can evaluate the current and potential future state of their stores.

As The DART Group establishes more retail partnerships, we will be able to streamline our store visit report process and complete reports with more efficiency and ease. We are working with Auburn University professors from the Harbert College of Business and College of Human Sciences to collaborate on research that investigates how ship-from-store fulfillment (SFS) structures and buy-online-pick-up in-store (BOPIS) services impact a customer's in-store experience. The research specifically looks at how these services impact perception of price, merchandise, store environment, and customer service. Secondly, the study observes store-level operational and financial tradeoffs of SFS services and how shifts in these areas are moderated by shifts in the shopping experience.

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Following the publication of the research, retailers will be able to make decisions about how or if to implement SFS and BOPIS services based on observed data versus anecdotal evidence stating these services are always positive additions to their stores. We plan to collaborate with the Auburn RFID Lab BOPIS Team, as faculty research is utilizing their paper, *Retail BOPIS Execution Study: Benchmarking Buy Online Pickup In-Store Readiness In The Retail Industry* and BOPIS Retailer Scorecard. Following data collection for this research, we expect to use the coded simulation model to evaluate the impact of BOPIS and SFS services on customer experience. This will help us improve the entirety of the PLM Model and its application for individual retailers.

Most recently, The DART Group has been further developing an innovative brick-and-mortar model that capitalizes on consumer demand for efficiency. As a result of utilizing the PLM Model and collaborating with faculty, we recognized an opportunity for layout innovation. This launched the development of the Low Contact Model (LCM): a retail format halfway between a dark store and traditional retail. The LCM expands back-of-house (BOH) operations to optimize SFS and BOPIS fulfillment models while prioritizing the in-store customer experience.

The Low Contact Model decreases customer contact interactions to a single displayed sample of each SKU that customers are welcome to scan with smart devices. Another innovative characteristic of the model is the relationship between BOH and front-of-house (FOH) operation; inventory moves around the BOH to mirror the decisions a customer is making via their smart device. Limiting customer interaction with merchandise through a streamlined fitting room experience and designated collection space decreases shrink, resulting in greater inventory accuracy. These high-tech fulfillment structures lend to the omnichannel purchasing of today's consumers.

The need for this model was recognized in 2020 with the expectation that brands lower customer contact with products and associates; the LCM model lowers this by utilizing interaction with one's smart device, in turn, decreasing interaction with merchandise and shared surfaces.

Short Term:

- Lower customer contact with products and associates

Long Term:

- Enhance SFS and BOPIS functions
- Maximize small scale fulfillment centers
- Create future-oriented shopping experience

Now more than ever, retailers recognize the importance of SFS and BOPIS services. By enhancing BOH operations, the LCM equips stores to operate as small-scale fulfillment centers while simultaneously providing a future-oriented shopping experience for in-store customers. Retailers have begun to optimize SFS and BOPIS services, some of the core tenets of the LCM, with industry predictions these practices will continue to evolve. Meaning, the model has validity and is desirable for a retailer today. Through the Low Contact Model,

DART is eager to spearhead the new standard for customer experience excellence, ultimately shifting the retail industry in a future-oriented direction. Furthermore, the PLM Model demonstrates the differences between what the consumer perceives as traditional compared to a highly innovative store format. This analysis expects to reveal the stores deemed as "advanced" actually have little operational difference to those that are perceived as "outdated" by the customer. An updated store layout can lead a customer to believe they are experiencing a highly-innovative shopping experience, but in reality, the process is nearly identical to a traditional shopping experience.

CONCLUSION

Quantifying customer experience propels us closer to the goal of closing the knowledge gap. The DART Group will continue to aid retailers in enabling systems that better align with customer demands. By partnering with The DART Group, retailers will increase engagement and ease shopping experiences to drive sales.

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ABOUT THE RFID LAB

The Auburn University RFID Lab is a research center that focuses on the business case and technical implementation of emerging technologies in the retail, aerospace, pharmaceutical, and manufacturing industries. Since its inception in 2005, the RFID Lab has conducted a series of seminal business value studies that have led to the adoption of RFID and other IoT technologies. Sponsors of the RFID Lab include Amazon, Avery Dennison, Boeing, Checkpoint, Delta Air Lines, FedEx, GS1 US, Intel, Hanes Brands, Mojix, Nike, NXP, Sensormatic, SML, Target, Home Depot, Walmart, and Zebra Technologies. If you would like to connect with the Auburn University RFID Lab, please contact Justin Patton at rfidlab@auburn.edu or 334-734-4034.

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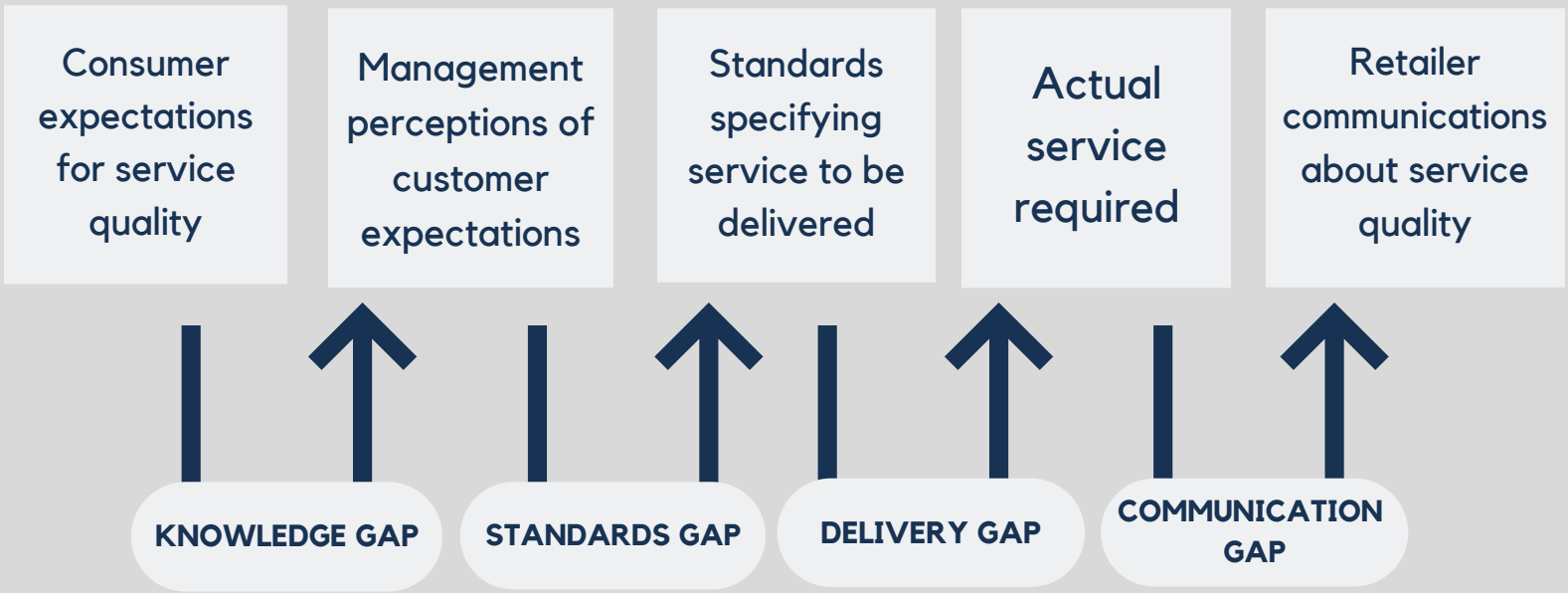
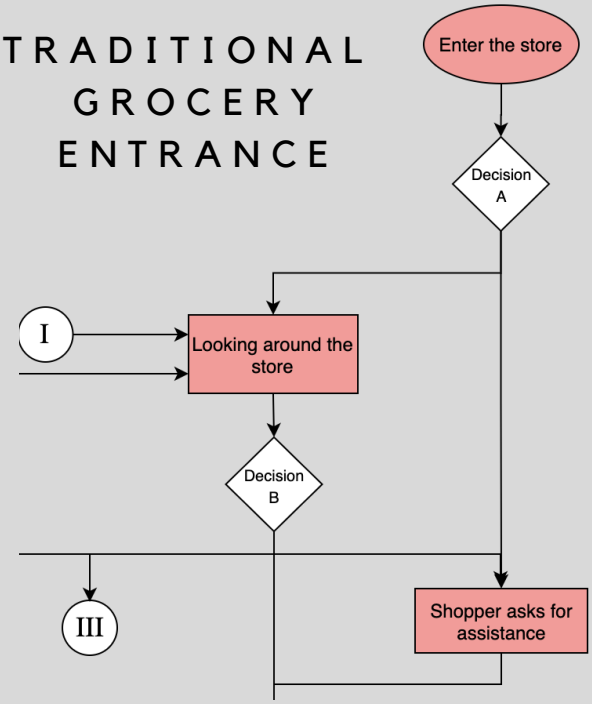
APPENDIX 1

THE GAPS MODEL

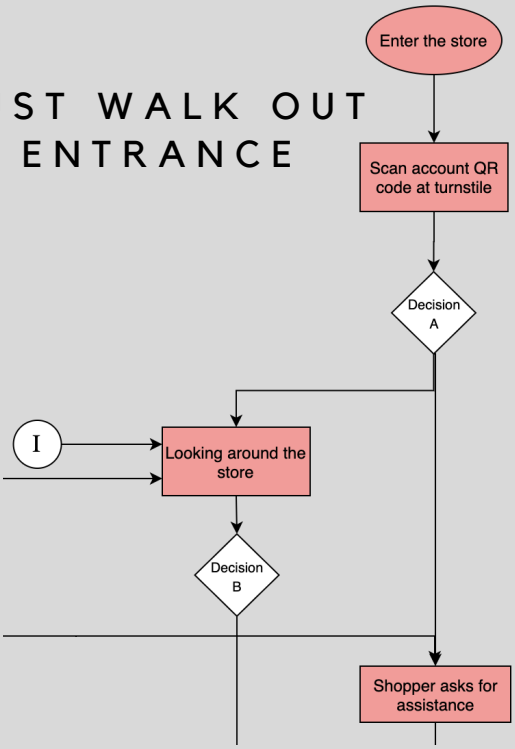


APPENDIX 2

TRADITIONAL GROCERY ENTRANCE



JUST WALK OUT ENTRANCE



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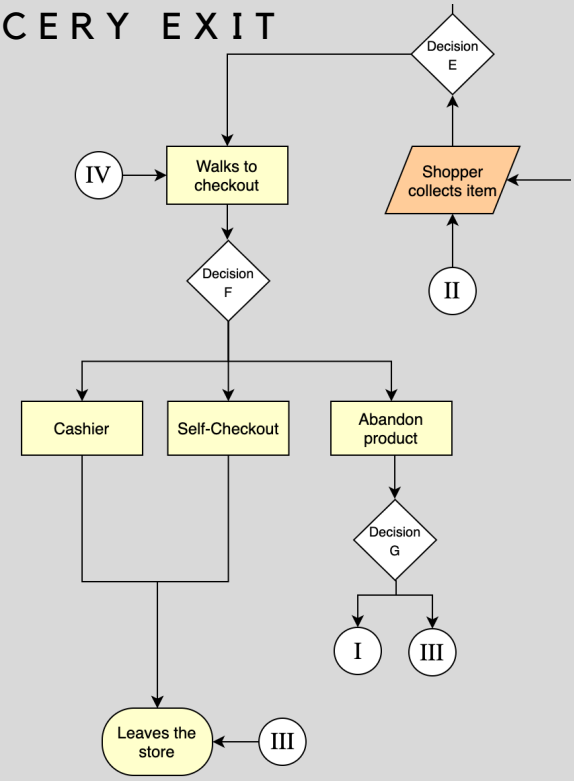

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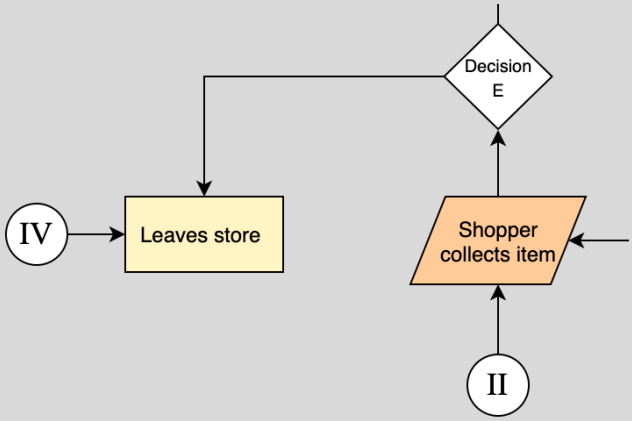
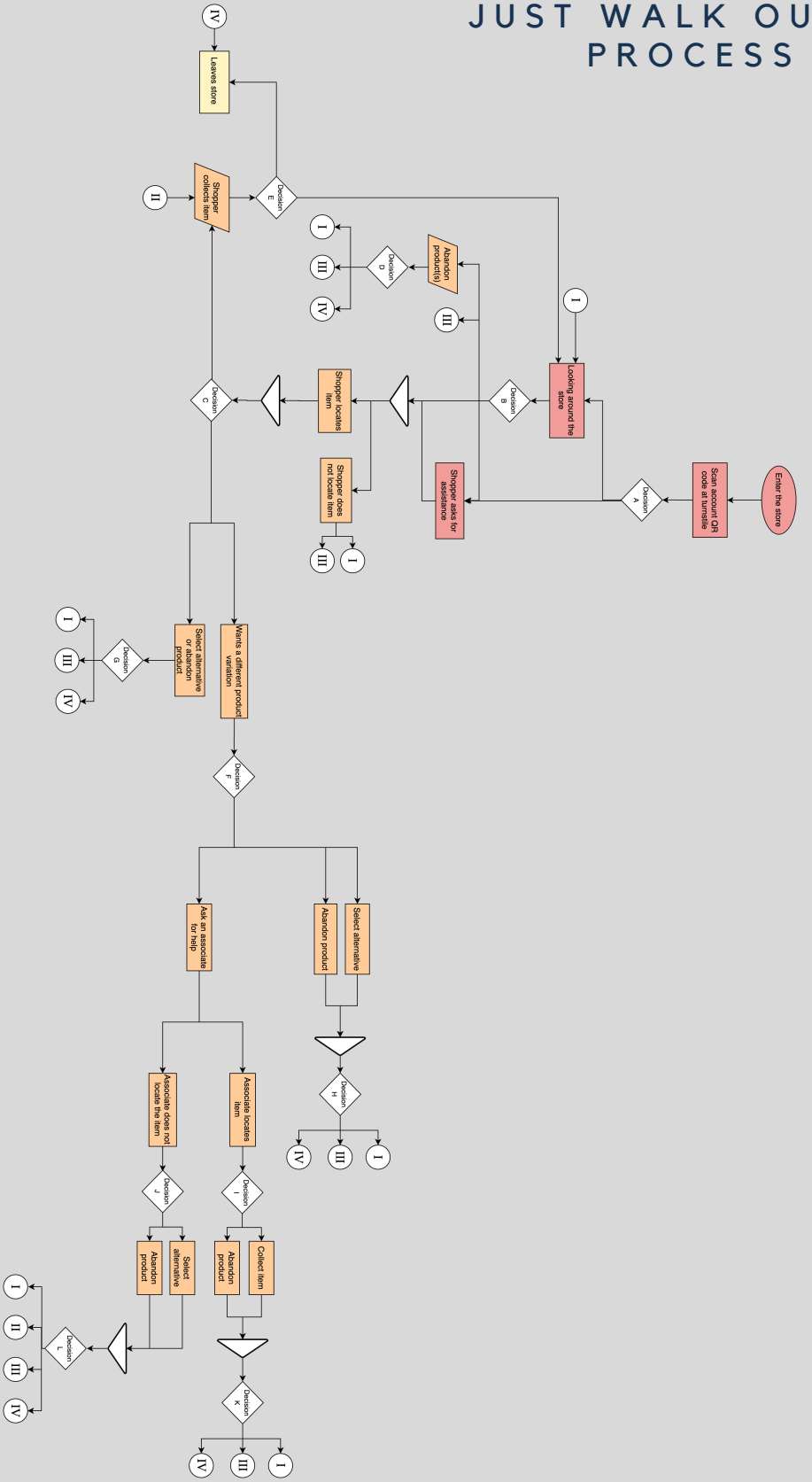


APPENDIX 3

JUST WALK OUT GROCERY PROCESS FLOW



APPENDIX 4

JUST WALK OUT GROCERY PROCESS FLOW