

INCREASING LEGENDS SALON REVENUE PER SQUARE FOOT

A Senior Project submitted to

the Faculty of California Polytechnic State University,

San Luis Obispo

In Partial Fulfillment

of the Requirements for the Degree of

Bachelor of Science in (Industrial and/or Manufacturing) Engineering

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June 2022

ABSTRACT

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Katie MacNamara acquired Legends Hair Salon in Atascadero, California in January of 2021. After a few months of learning to run her own business she discovered that her retail revenue per square foot was not high enough. Her goal, and the project objective, was to raise her revenue while also increasing space for her stylists. The metrics used for these objectives were revenue per square foot and the square footage of the retail areas. The beginning state metrics were 48.75 square feet of retail and a retail revenue per square foot of \$2.15 with a total of six stylist stations. The immediate solution that the team created was to make some facility layout changes such as moving the front desk to open up a retail area in the entryway and change the storage room to a pedicure room so that there was more space for another stylist booth. In addition to the facility changes, selling strategies were improved. Retail items were strategically placed along a customer's "critical path" so they would be more likely to see them while going through the regular steps of a hair service. After making these immediate changes, the retail square footage increased to 78 square feet and the retail revenue per square foot was raised to \$3.47. To help Katie to keep track of her sales data in a more user friendly way, a dashboard was created for her to input data and view the sales trends, total sales, revenue per square foot, and a quantity count of which brands are selling the most. A t-test was run to determine if the changes made were significant. The test data was from February-April of 2021 and February-April 2022 and the p-value was 0.036, further proving the assumption that the changes benefited Katie's salon. From here, long term solutions were created with the assumption that, in five years, Katie would be able to purchase her salon and completely redesign her space including plumbing and moving walls. There were 3 different layouts created and a simulation model was run for each of them.

According to the simulation, design 3 would bring in the most revenue. A Multi-Criteria Decision Analysis was created to further analyze the models. The model focused on the design's ability to maximize revenue, increase retail space, increase retail visibility, increase customer comfortability, feasibility of implementation, increase in stylists stations, the A-efficiency score and sponsor approval. From this, solution 2 was the best design. Since Katie preferred solution 2 the most and it was only simulated to make \$100 less than solution 3, it was chosen as the recommended 5-year plan.

ACKNOWLEDGEMENTS

We would like to acknowledge the help provided by both Dr. Jill Speece, our advisor, and Katie MacNamara, our sponsor. Throughout the course of this project, Dr. Speece has provided us assistance in writing this report as well as guiding us through the solution development process. Our sponsor Katie has aided us by answering many questions, giving us access to her business model, and being open to every solution we provided her.

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1. Introduction and Background

The company name is Legends Hair Salon and it is located at 4855 El Camino Real, Atascadero, CA 93422. The sponsor's name is Katie McNamara and she has been the owner of the salon for the past eighteen months, when she took it over in January 2021, and has worked at this salon for the past five years. She purchased the salon from her aunt. Katie has been very successful in running this business however she wants to be able to prepare for future expansions within her business. She has already cosmetically remodeled the salon, by painting the walls, moving the front desk, and installing new stations. She did the remodel in about three days, as she was trying to open the salon quickly after she took it over. After owning the salon for almost a year, she has noticed some fundamental issues with the facility layout of the salon. She has found that the mixing area gets very crowded, retail sales have slowed down, and she doesn't like the current use of her space.

She has been working very well with the team so far and has been very open to many of the suggestions for the project. She is very open to change and nothing is really set in stone with her store. She wants to be able to maximize her revenue through selling products, cutting hair, and charging other hairstylists rent for use of the chairs within her Salon. She has desires to come up with short-term (improvements within the year), medium-term (improvements in 2-3 years), and long-term (improvements in 5 years) layouts for her salon so that she can increase revenue per square foot from the current \$67 to \$500 in 5 years.

2. Problem Description

Legends Salon is currently not meeting its revenue goal due to facility and layout issues. The team hopes to fix this problem by trying to increase revenue per square foot from \$67 to \$500 in 5 years with immediate solutions to implement within the next year and long-term solutions to implement in 5 years.

One part of the project is to make facility layout improvements so that Legends Salon can maximize the revenue per square foot for Katie and her hair salon. The second part of the project will be looking into retail strategies to improve overall retail product sales which will increase the overall revenue per square foot. This will involve time studies, spaghetti diagrams, cost analyses, and research on popular retail practices.

POS data from the salon regarding retail sales allows for further analysis to be done on the current revenue per square foot for the total store and for individual retail spaces. As shown in Table 1, the current revenue per square foot for the entire salon is \$12.87 per square foot which represents revenue solely generated from retail/product sales. This will be an important value in the future to look back on because to increase the entire revenue per square foot the team will have to focus on this area of improvement.

In house product sold	\$15,759.99
Total Retail Square Footage	48.75 ft ²
Revenue per square foot for purely retail area	393.99 \$/ft ²
Revenue per square foot for total salon area solely earned from product sales	12.87 \$/ft ²

Table 1: Retail Product and Revenue per Square Foot Analysis

Revenue Per Square Foot



Figure 1: Fishbone Diagram

The team used the fishbone diagram to come up with the cause and effect of the salon not reaching its ideal revenue per square feet requirement. From this fishbone, the team was able to focus on these specific aspects of the salon that were not contributing to a gain in revenue. The four main areas the team found were the Floor Plan, Retail Sales, Stylist Station Utilization, and Time for a Haircut. With these 4 categories in mind, the team can cater the short term solutions to solve these issues.

Legend

- Mixing/Laundry Room
- Wash Stations
- Storage
- Manicure/Pedicure Station
- Retail
- Stylists Stations
- Desk
- Sitting Area
- Bathroom
- Wall
- Writing Station
- Coffee Area

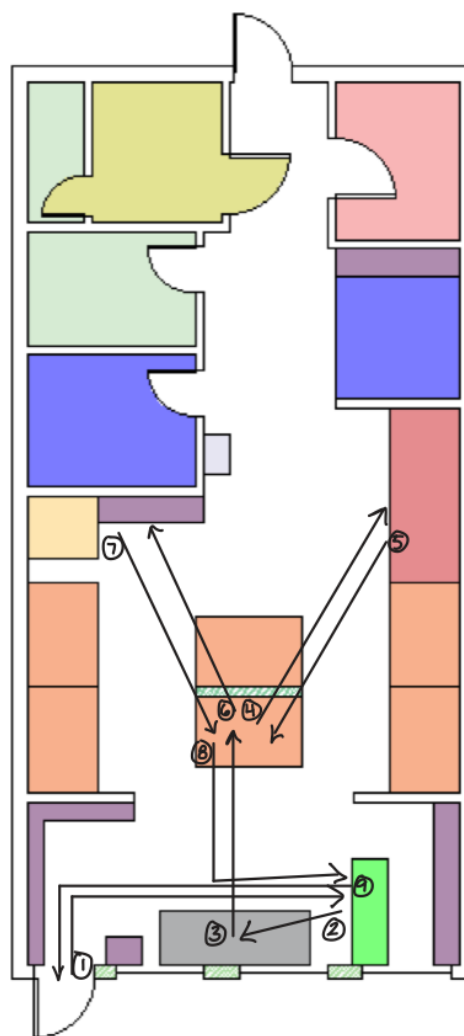


Figure 2: Spaghetti Diagram Showing Current Customer flow

During the literature review, the team focused on revenue per square foot, retail patterns, product placement and rotation, salon floor plans, ergonomics, best practices for a salon, types of clients and their preferred products, and ways to get retail items. All of these topics pertain to the ultimate goal which is to increase revenue per square foot at Legends Hair Salon. After speaking with Katie, she told the team that her retail products generated a decent amount of revenue, but it could be a lot more. She mentioned that she used to work at a salon in which through just commission on retail products she could pay her rent.

From the literature review, this team learned about retail turns and patterns in retail.

Katie needs to identify different types of key performance indicators (KPIs) that she will use to measure the growth of her salon. Tracking important revenue KPIs can help Katie figure out what parts of her retail business are bringing a lot of revenue versus what is not. In order to determine sales per square foot, she needs to divide her sales by the salon's total square feet of sales space. (Square) She can begin by calculating the current revenue per square foot can be an easy comparison for future square feet. Benchmarking revenue per square foot with her current state of salon and other salons can be helpful for a fair comparison. (Osteryoung, 2007) Revenue per square foot, which is also called revenue or yield management, is the main KPI that the salon uses. Many other industries use revenue per square foot as well to determine how their business is doing. For example, hotels use ConPAST, a management software, as a tool to determine yield management. ConPAST has three components that it follows: contribution, space, and time. Measuring these three things can assist with revenue management and determine ways to increase revenue per square foot without only assessing the product sold. (Kimes, 2001)

Currently, many retail stores are doing trend analysis on different types of retail, trying to find out what types of retail products different types of customers like. There are many different studies that discuss recent retail patterns specifically regarding advertising. What is currently being advertised on TV and online really drives retail sales. Advertising is very effective and people are tending to purchase things that are heavily advertised both on TV or social media. (PR Newswire, 2009) Therefore, for the salon to align with retail patterns, it needs to sell what is currently being heavily advertised in the media. Moreover, retail sales patterns repeat every few years. The trends follow a cyclical pattern which makes it very easy to predict trend patterns. By analyzing historical retail sales and patterns, business owners can determine what will be on-trend in future seasons to optimize retail sales. (NY Times, 1953) Especially during heavy revenue-generating seasons, such as the holidays, Katie can track customer behavior, supply

chain issues, and inflation. If Katie were to follow the trends for the holiday season, she could make more money off retail because the retail she offers will follow the trends thus maximizing the revenue earned based on the type of products she offers. (Deloitte, 2021) She can also understand the stages of the fashion cycle which can help Katie determine what type of fashion she should sell and when. By selling clothes that align with the fashion cycle, Katie can optimize the retail she is selling. (MasterClass, 2021) In addition to the trends, Katie can also weigh her retail products. This would help Legends Salon because they already have limited storage space so weighting their products based on the most popular would allow them to hold a higher inventory for those products instead of wasting storage space on products that were not as popular. (Desrochers, 2000) This is pertinent to Legends Salon because Katie will be able to match her salons to the new trends to maximize the revenue output. Katie can even take surveys with her clients to see what trends they are enjoying and what trends they are looking forward to. Client analysis can also be done to optimize the types of products that are sold. This team can gather valuable information on the age ranges of people that partake in the top 10 beauty and grooming services for women. The top 4 were Hair Cutting, Manicure or Pedicure, Hair Color, and Hair Styling/Blow Drying. The graphic then broke down the age ranges from 18-25, 26-45, and 46-65, listing the percentages of each age range. (Moratto, 2019) There is a lot of data summarizing the target customers of the beauty salons. It also provides statistics on revenue stating that customers between 45 and 54 years old contribute around 20% of revenue to the beauty salon market. Additionally, people between 34 and 45 spend more money on hairdressing, skincare, and nail care. (Reddy, 2020). Katie can use this information to alter her customer base and optimize her revenue coming in. Based on the types of customers Katie has, Katie can stock those products to make sure she will be selling the most product possible.

Product rotation is also the main component of retail sales. Product rotation is key to increasing sales. Product rotation can affect customer behavior in a good way which then increases the sales of the company. This can be very applicable to this project in hopes to increase the revenue per square foot with some dynamic product rotation. (Bernstein, 2016) By determining when products should be rotated, Katie can optimize all the products she displays, therefore making more revenue. It is important to look at other industries that also utilize product rotations. By benchmarking a big pharmaceutical company, Leiner Health Products, it is possible to determine how they use a product rotation plan to help increase their sales. They were able to show this increase in their second-quarter earnings results. This will help look into a product rotation plan and apply it to this project with Legends Salon. (Business Wire, 2005) Zara, the department store is another example of a company that heavily relies on product rotations. Zara is constantly rotating their products and how they do this. Zara has a similar selection of products to the salon. In hair and beauty, customers want the next best product, and looking at Zara as an example will help Legends keep up with this constant product rotation. (Caro) For even more similar products, skincare can be used to create a fair comparison. Legends salon can look at the global skincare market by product type to understand what other products they could include in their retail space. This could lead to an increase in product diversity which can help increase revenue per square foot. (Origin, 2021) After doing trend and product analysis on Katie's retail selection, the team can determine what her product rotation should be to optimize revenue.

Along with product rotations, it is important to also consider product placement. Companies use retail rack layouts to optimize space. (Mowrey, 2018) Having specific retail placement inside the store can increase revenue. Tailoring the product placement to the type of customers that are coming to the salon, Katie can create a strategy to optimize her revenue. (Gaur, 2021) Many retail stores change the shopper's path to alter a department's visibility. By making shoppers pass lines of product, they can increase a department's impulse revenue. Katie

can move items in her salon to where customers spend a lot of time. For example, she can place products near where customers sit when their hair is getting cured or in the waiting area. (Hipara, 2020) Katie can also begin to do work to develop a network-based representation for the salon layout and use the representation to simulate a process where Katie can predict where customers will go to. (Botsali, 2005) Customer purchasing behavior can also change based on environment and emotions. This can result in the influence on aspects of consumer purchasing behavior with actual shopping behavior. By capitalizing on this customer behavior, Katie can keep popular products in a clear line of sight to make sure she is capturing this audience. (Sherman, 1997) Retail pricing is also an important aspect to increasing revenue. There are certain types of innovations behind competitive retail pricing. One of these is promotions. Promotions can target customers both offline and online. This article discusses how a retailer can learn patterns from their customers based on promotions as well. This could also be helpful in setting up a discount for the product walkthrough gift bag or a promotion/discount wall with markdown products. This could be another way to strategically get rid of inventory that has been sitting with a low inventory turnover rate. (Grewal, 2011)

Similarly, there are certain retail trend analyses of patterns that can help bring insight to what is in the customer's mind. Retail performance is discovered through macro and micro retailing studies. The studies depend on the shopping patterns and external factors that could affect the customers. Different store layouts and locations can present differences in customer behavior. These influences could include pricing and location. Location specifically alludes to accessibility of product and location in store essentially determining how "far" customers will go to get products they need. The data should be grouped by significant differences. In this project's case, the grouping would be based on brand and types of product. The data needs to be cleaned of missing values, duplicate values, and outliers. (Ramansh, 2020) Using a case study from Ikea, Ikea has a racetrack layout (key feature), allowing customers to see almost every product that the

store has placed with a main aisle that passes through the areas, as seen in Figure 4. (Santos, 2019)

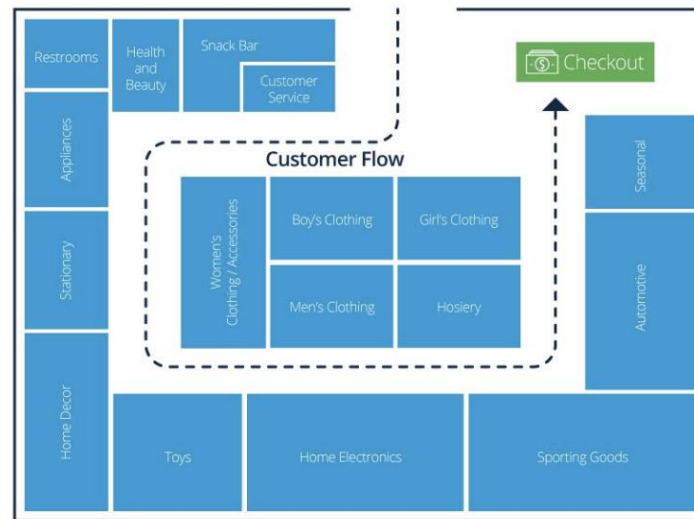


Figure 4: Racetrack Layout of Ikea (Santos, 2019)

Shopping path lengths can also have a purchase behavior. This study specifically looked at which areas of a grocery store have the largest purchase sensitivity. Based on the grocery store model, areas towards the front of the store have the highest purchase sensitivity. The study also looked at another factor that could affect profit mix called the wandering degree. This is the distance walked in the area per square foot. To be successful, it is essential for the wandering degree to be greater than 1, meaning the distance walking within the area is longer than one side, to have the customer wander in the area which can lead to impulse purchases. Having an area with a high purchase sensitivity and high wandering degree can create the most optimal profit mix. Figures 5 and 6 shows the areas in store with high purchase sensitivity in a grocery store. The team used this study to determine which parts of the salon had high sensitivity and a high wandering degree to promote impulse purchases, and in turn increase revenue. (Kholod, 2010)

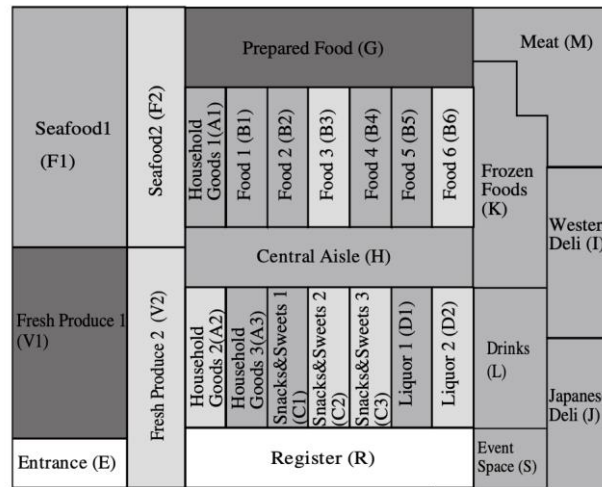


Figure 5: Layout Showing areas with Purchase Sensitivity (Kholod, 2010).

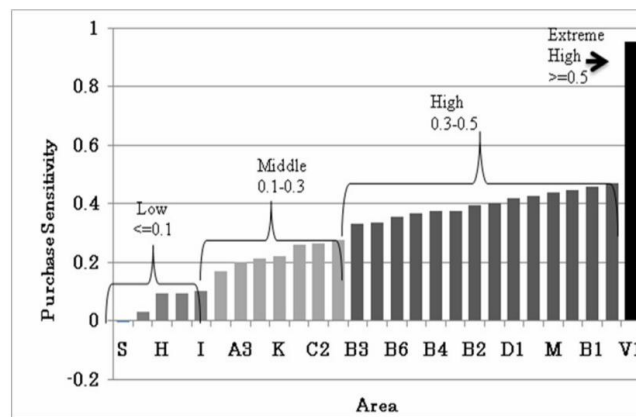


Figure 6: Graph Revealing Purchase Sensitivity for Different areas (Kholod, 2010).

To create future long term layouts for the salon, the team turned to REL charts. The REL chart lays out the amount of flow units moved in between each of the activities as well as the cost associated within each of these (Tompkins, 2010). Since the team is looking at relatively low amounts of flow for each of these activities it does not weigh into the effect of possible solutions as much as a warehouse would. The REL chart clearly depicts how the activities in a facility relate to each other, with specifics on giving the activities the correct score. (Sharma, 2018) Currently, there is a fundamental problem of the optimization of facility layouts. There is a heuristic algorithm called mixed integer programming that allows a facility to be optimized. The

model works for smaller problems, which is why it would be perfect to implement in the salon.
(Meller, 1999)

When trying to increase revenue, it is important to find new ways to attract new clients to a salon. One of the best ways to increase revenue is to attract new clients to come into the salon. With more clients the revenue that the salon can increase so having strategies to attract these customers is extremely important. One of the pieces of advice was to focus on attracting ideal clients, not just anyone that walks through the door. The priority should be people that will spend money in the salon and also will come back because the article also mentioned that salons lose 10-25% of clients each year. (“How to Attract..., 2022)

To determine which long term solution was the most viable, the team turned to simulations. There have been recent technological innovations in regards to computer graphics and simulations have helped marketers. By having the ability to create a virtual environment that simulates a store front, marketers are able to analyze the store front and see what adjustments can be made before implementing them into the store. Additionally, they have freedom of imagination because it doesn't really cost anything to administer these changes. They pretty much create their own marketing lab to experiment with new ideas. This showed me some other applications of simulations or virtual demos for industry. (“Virtual Shopping..., 2014) Agent-based simulations systems are able to derive spatial distributions of retail centers by simulating the interactions between these centers and the consumers, which were used when creating the simulations for the salon. (Zhu, 2015) Recently, simulations have started branching out and reaching into the service industry. Simulations help businesses evaluate and implement solutions to problems that they might experience in their business. Specifically, discrete-event process simulations have been used to analyze and solve problems in a salon. The salon contained haircuts, coloring, manicures and pedicures. The simulations helped address issues such as the size of some of the areas and allocation of priorities. (Williams, 2018) Simulations are valuable

because the user is able to apply this technique to many different disciplines and areas of work.

The technique replaces and amplifies real experiences with ones that are guided to get real world results. (Lateef, 2010) Through this research, the team realized the importance of simulations and the possible information gained by doing them.

The ergonomics of a hair salon are also very important to consider, especially to make sure the stylists are comfortable. Standing for prolonged periods of time in awkward body postures, handling a variety of chemicals, and undergoing repetitive hand movements are all high-risk areas for injuring oneself as a hairstylist. Katie needs to examine the levels of risk at the task, organizational, and personal levels. (Ososky, 2008) Similarly, hairdressing chemicals, awkward work postures, and repetitive movements were the most frequent causes of discomfort and for some had caused a work-related disease. Good general ventilation decreased the health complaints caused by hairdressing chemicals but caused discomfort as a result of drafts. (Leino, 1999) The age of hairdressers, their years of working, and the long hours they spent working in a standing position may be significant factors that contribute to the high prevalence of work-related musculoskeletal disorders (WMSD) among them. The most commonly affected body parts included the low back, shoulders, and neck. (Aweto, 2015) Out of the 204 hairdressers sampled, 137 indicated the presence of WMSD, particularly in the neck, shoulders, and lower back. Gender, hours worked per week, age, and previous non-work-related injury also had an effect, but years of experience and previous education on injury prevention did not. (Best, 2002) For the short-term solution, the team hopes to decrease foot traffic for the nail technician by moving the pedicure chair to the same room as the manicure station.

In the long-term solution, the team hopes to make the stations more ergonomic for the stylists to ensure that they will not have any health problems associated with their work.

Another important aspect of a service industry is the dimensions in assessing the servicescape of beauty salons. The dimensions can be broken down into three specifics: the substantive staging of servicescape, the communicative staging of servicescape, and the social staging of servicescape. Each dimension has factors to it starting with the substantive staging of servicescape: ambient conditions, facility aesthetics, artifacts, provisions, and spatial layout. Communicative staging includes the factors of employee duties, employee commitment, employee-customer interactions, and employee image. Lastly, social staging includes the factors of customer characteristics, and customer-to-customer interactions. All of these dimensions and factors were listed in importance from most important to least from the customer's point of view. (Kampani, 2020)

In addition, focusing on the type of products used when giving hair services can be helpful to sell more products, thus increasing retail revenue. Stylists can incorporate the retail purchasing process into each stage of the hair cut. In the consultation, the stylist can use that as a time to ask the customer what they like/don't like about their current hair and what products they are currently using. Then at the shampoo bowls, they can tell the customer what shampoos or conditioners they are using and why they chose it. During the service, the stylist can highlight rotating or seasonal items and at checkout they can either choose to show the customer all of the products they used or go for one product that they believe the customer could benefit most from using. (Nelson, 2019) Educating the stylists makes all the difference in retail sales. If they don't know the products that the salon is selling well enough, they will not be able to recommend and sell them to the customers. It is recommended to make a product sheet with all of the products on it along with their descriptions. Stylists then have to sit down and write their comments on each product and take a product knowledge quiz. Along with the product knowledge, the stylists get a 10% commission from what they sell which has helped motivate them to hit their benchmark. (Nelson, 2018) Another option is using the 9grid system which helps stylists brainstorm easily to

increase their retail sales. The key ways found were: talk about skin care for the new season, let clients hold/touch products during the service, pick one product to focus on weekly, tell clients about new products relevant to them, explain at-home maintenance, put specific products in front of them rather than show them the wall of retail, and look at the client's history before recommending. By doing these things, the stylist will be more likely to build a relationship with the client which will increase the chances of them coming back as well as increasing their retail sales. (Nelson, 2019) There can be success that can stem from front desk employees having as much product knowledge as the stylists. When customers come in just to buy retail, they are probably planning on stocking up so the more the front desk can offer, the better. Some good questions to ask are "Is this working well for you? Do you have any questions about this product? What else do you typically purchase? Do you use another product with this one?". This way, the front desk assistant can understand more about the customer and their retail needs. (Nelson, 2020) From this research, the team determined that it can be helpful to boost retail sales by incorporating some kind of product walk during the styling service.

In behavioral economics, the "endowment effect" describes the robust finding that prices people are willing to accept (WTA) for a good exceed prices people are willing to pay (WTP) for the same good. The increase in WTA values is often explained by the sellers' negative response to losing their item. Recent studies, however, show that subtle cues may change participants' perspective, influencing their valuations. There are hypothesis that implicit connotations of instructional language may be one of those cues. To test this hypothesis they manipulated the wording of instructions in two conditions: in the sell condition, subjects were endowed with a set of pens and asked to select an amount of money for which they would sell the pens back and in the Take condition, subjects were endowed with the pens and asked to select an amount of money they would take for the pens. Participants in each condition also estimated the market value of the pens. Consistent with the hypothesis, WTA in the Sell condition was higher than in

the Take condition, though there were no differences in market values between conditions. These findings show that instructional language does influence participant valuations. Furthermore, it is suggested that those being asked to "sell" use their market estimations as the salient reference point in the transaction. (Manson, 2015)

For proper display of the findings, there needs to be an intended data visualization. There is now a strong need for data visualization because there are large numerical models that need to be processed. Computer and data visualization graphics help make it easier to understand large sets of numbers (Data Visualization..., 2003). The team decided to use Google Data Studio as a method of data visualization. When analyzing transactions, it is important to group the data in market baskets. This helps order the data points so that the results can be easily understood. The clusters of transactional data is necessary for "obtaining easily interpretable and actionable results" (Ghosh 2005). Putting this into practice, when making the data visualization dashboard, the team clustered the data using brand. This helps Katie easily view what brands are doing well, vs the products that are not. Now, the product rotation can occur by brand based on the data analysis and visualization.

4. Solution Design

Short Term Solutions

The short-term goal(1) is to move the front desk station to the center of the entry and remove a station in the front to allow for a more open entrance. This will allow for more shelves to be added which leaves more room to add products in the front area of the store. This will allow customers to browse more freely when entering the store or waiting for a haircut, increasing product sales and revenue. One disadvantage of this solution is that the salon would be losing one of the stylists stations, which will now be at a total of six stylists booths. Another disadvantage could possibly be adding more traffic to the system.

For these solutions, the team came together to brainstorm these ideas after a few visits to the salon. Once the team had completed some initial benchmarking by traveling to different salons and completed some initial literature review, the team began brainstorming solutions. Based on the research the team conducted, there was a good baseline for the team to come up with the three solutions. Stakeholder feedback was also taken into consideration. The main things that the team wanted to focus on were increasing retail space, creating new shelving, moving washer dryers, and increasing the mixing area. The following solutions are ways that the group came up with to solve these problems.

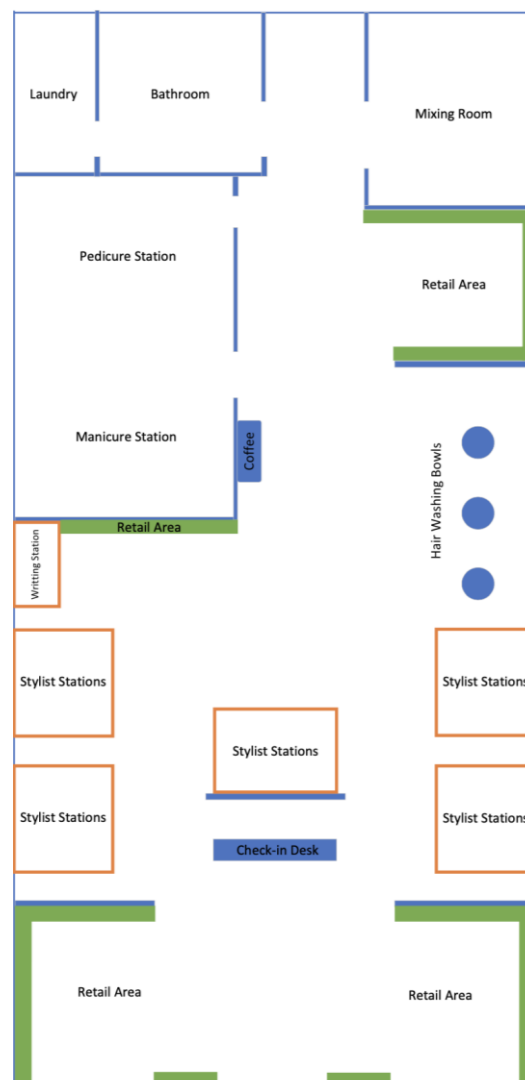


Figure 7: Blueprints of Solution 1 Design

The short-term goal (3) is to not break down the wall between the nail area and the storage room and instead just move the pedicure chair into the storage room and keep these two areas separated. This would then allow for the mixing area to be moved into the old pedicure area and thus the stylists would have more room to mix the hair color. The old mixing room would then be left to laundry/storage. One advantage of this approach is that this requires the least amount of work because there will not have to be any demolition of the wall in between the nail area and storage room, which saves time and money. However, a disadvantage of this is that the manicure and pedicure areas will be separated and the technician will have to walk back and forth between these areas.

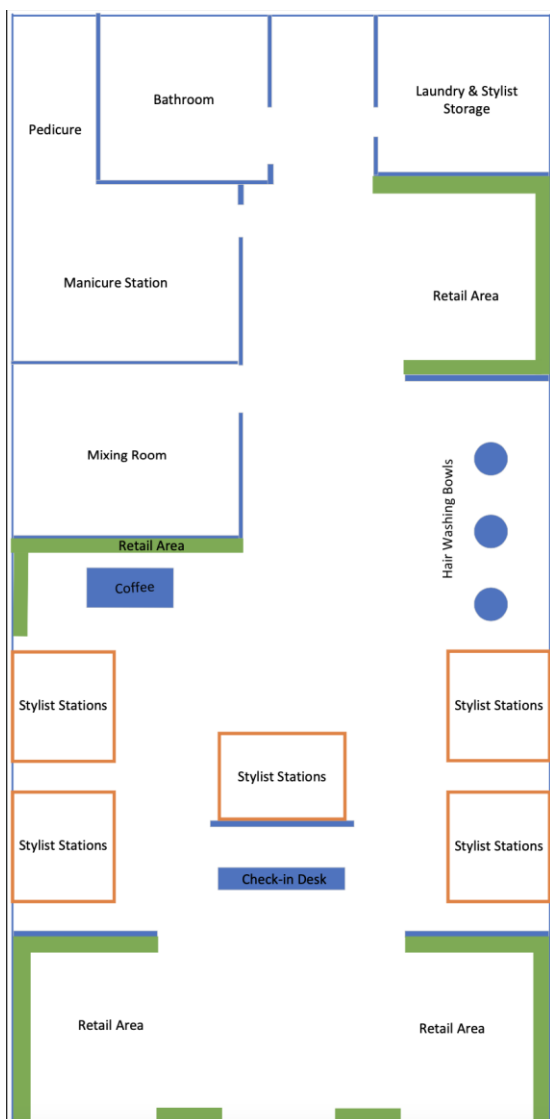


Figure 9: Blueprints of Solution 3 Design

Criteria	Maximize	Increase Retail	Increase Retail	Increase customer	Fea
Weights	10	10	7	5	
Solution 1 - Moving Pedicure/Laundry, keeping mixing and storage the same	6	5	7	7	
	There isn't too many additions for retail area however moving pedicure station does benefit revenue	Increase Retail Space from 48.75 Square Feet to 99 Square Feet. Increasing the space by 103.08%.	Retail Visibility is increased by getting rid of the pedicure station and focusing that area solely on retail	With the addition of the retail spaces in the front and the back there is a lot more area for customers to relax during their	This i so imple we wo to mov mac pedic
Solution 2- Moving Coffee Station, moving pedicure/laundry, keep mix and storage	8	7	8	8	
	Coffee Area with Retail would be introduced which would help maximize revenue	Increase Retail Space from 48.75 Square Feet to 112.5 Square Feet. Increasing the space by 130.77%.	Retail Visibility is increased especially when you walk right in the door with the coffee station	The coffee station would benefit the customers comfortability a lot because they can get their coffee then sit down and look at	Th some imple there demoli with creat
Solution 3 - Pedicure station in back storage, Big Retail Area, Washing machine the same	10	8	8	9	
	The retail area that is created with the movement of the pedicure station would greatly benefit revenue	Increase Retail Space from 48.75 Square Feet to 115.5 Square Feet. Increasing the space by 136.92%.	With the 2 tables in the back of the store for retail the visibility has increased a large amount	Since there are two tables now in the new retail area there is also seating for customers to hang out at	We w demoli wall: wall a woul mover of the salon : be a c

Table 2: MCDA Matrix for solution weights

The image above shows the MCDA matrix on how each solution compares to one another. Solution 2 ranks the highest out of the three and thus this is the solution that will be chosen. For this MCDA the most amount of weight was placed on 3 criteria; maximize revenue, increase retail space, and feasibility of implementation. For the increased retail space, calculations were performed to come up with the total increase in square footage caused by the design changes. The team also had to think about the feasibility of implementation as a large factor because these solutions have to be implemented within the year. Additionally, the team wanted to limit the financial amount these changes would incur so that Katie can continue reinvesting money into salon improvements instead of just renovations.

Solutions	Cause	Effect
Solution 1: Moving Front Desk	Current retail space is not ideal limiting revenue per square foot	Opens the current front desk area up to allow for more retail and product space
Solution 2: Breaking Wall Down	Manicure and Pedicure stations were separated	Allows for a singular space that incorporates retail of that nature
Solution 3: Move Washer/Dryer	Needing a specific room for mixing hair product	Using the current laundry room as a specific mixing room to create more space for stylists

Table 3: Solution Breakdown

Short Term Solution Implementation Update

The solution design that the team implemented had to be modified as time progressed from the original start of implementation. The main items that were not able to be completed in the short term were removing the wall between the manicure and storage room as well as moving the washer & dryer into the storage room next to the bathroom. The reason these could not be completed was because Katie does not own the space and the landlord did not allow these renovations. These are key renovations to improve and optimize the space, so they will be added to the long-term solution designs, in hope that Katie will own the salon in the next 5 years. The improvements can be seen in figure 10 below.

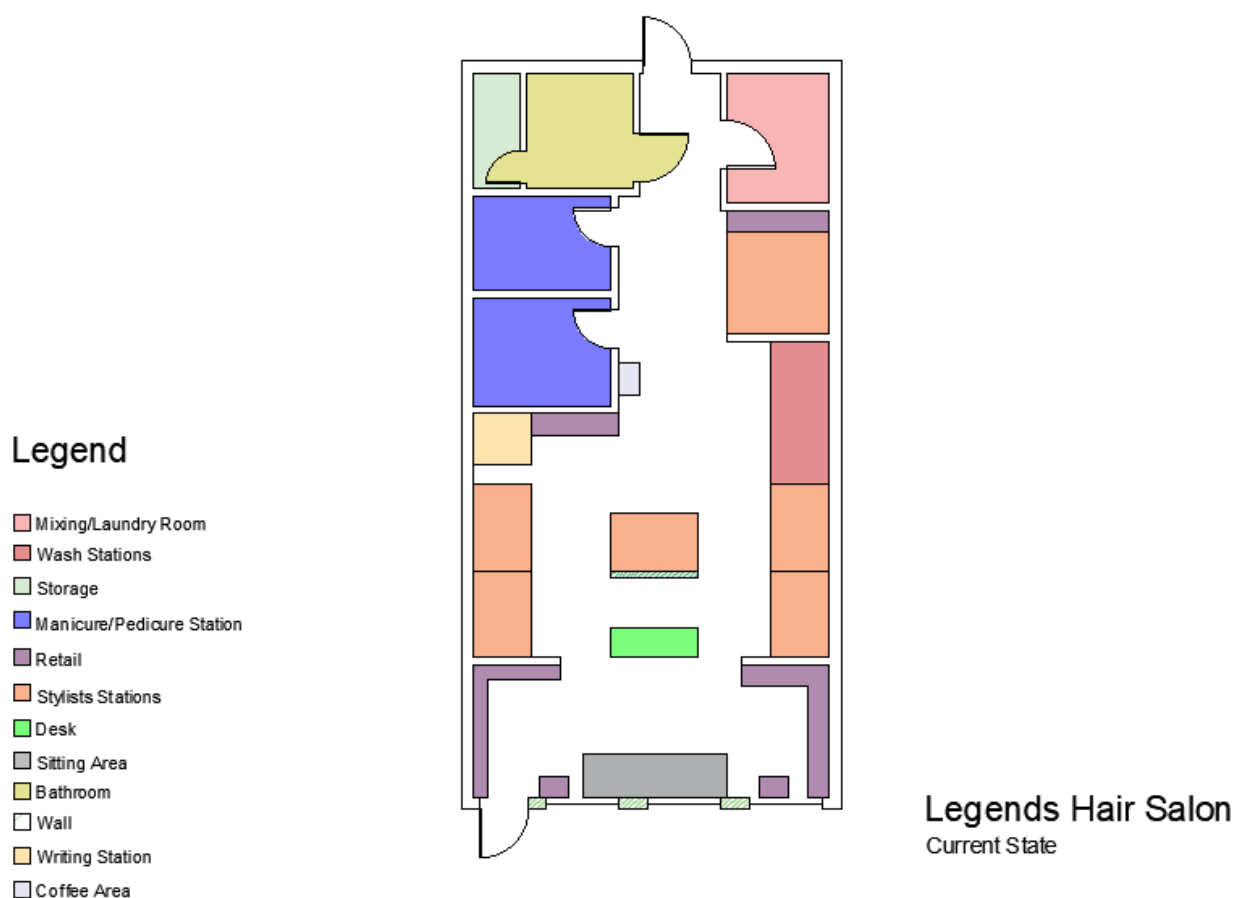


Figure 10: Short term Implementation Layout

Medium Term Solutions

The medium-term goal is to implement a product sales plan for the salon that will allow for the salon to increase the revenue per square foot. This will be achieved by implementing a dynamic system that the salon can use for years to come to properly rotate products throughout the store. To increase revenue per square foot the team will be testing new marketing strategies to incentivize customers to purchase products.

The first of the marketing strategies that will be implemented is the use of a “product of the month” area in the salon in which a new product will be showcased in its own area. This product of the month section will always be in the same spot of the salon, the bottom right corner when looking at the layout. This dedicated section to new products will create a constant demand

and curiosity for customers coming into the salon as they will want to see what products are on display. While the name hints that the products will be rotated monthly this isn't a set time schedule. If a newly added product is selling well and consistently over the span of a month then this product can continue to take up this section of the store until the product isn't in demand anymore.

One thing to focus on for this section and all retail aspects of the store is keeping a good rotation of products so that there are no products sitting on the shelves for months on end without being sold. Having a product sit on the shelf and not get sold is not only a waste of space but also a waste of capital for the salon. A big focus for increasing revenue is to maintain a high turnover rate for products so that capital is in constant movement in and out of the salon. One way that this can be done is through use of a pull system where a customer requests a product and then they receive it. This can be done in two different ways; a customer calls ahead and requests that a certain item is ready for them the next time they come to the salon, or the customer orders the item that day in the salon and they will be notified when the item comes in. Many salon products are expensive and instead of having them sit on shelves waiting to be sold, the salon can save their capital until there is a direct demand for the product.

Another aspect of the medium term solution includes building a macros Google sheet that will simplify the trend analysis portion. A macros Google sheet includes an action or a set of actions that can be run as many times as necessary. In terms of the salon, Katie will run this macro sheet every month to determine the top products and brands of the month. The Google sheet will include an area to import sales data from Vagaro, her point of sales (POS) system, which will be connected to a macro button that will create a pivot table of the vital information, similar to what is shown in Figure 11. In addition, the macro will build a graphical depiction of the sales data, seen in Figure 12, that will clearly show the top selling brands and the less popular brands for the month.

Brand	Sum of Profit	Sum of Quan		
Enjoy	\$ 168.65	16	\$ 10.54	
Amika	\$ 64.41	7	\$ 9.20	
Consignment	\$ 61.56	4	\$ 15.39	includes purses, hats, gloves, etc
Olaplex	\$ 36.50	3	\$ 12.17	
Jewelry Junkie	\$ 21.00	1	\$ 21.00	
Evo Fabuloso	\$ 19.98	1	\$ 19.98	
Keune	\$ 11.50	1	\$ 11.50	
Sebastian Shaper	\$ 9.95	1	\$ 9.95	
Grand Total	\$ 393.55	34		

Figure 11: Breakdown of top Products sold During the Month of February (Includes profit per brand and sum of total profit)

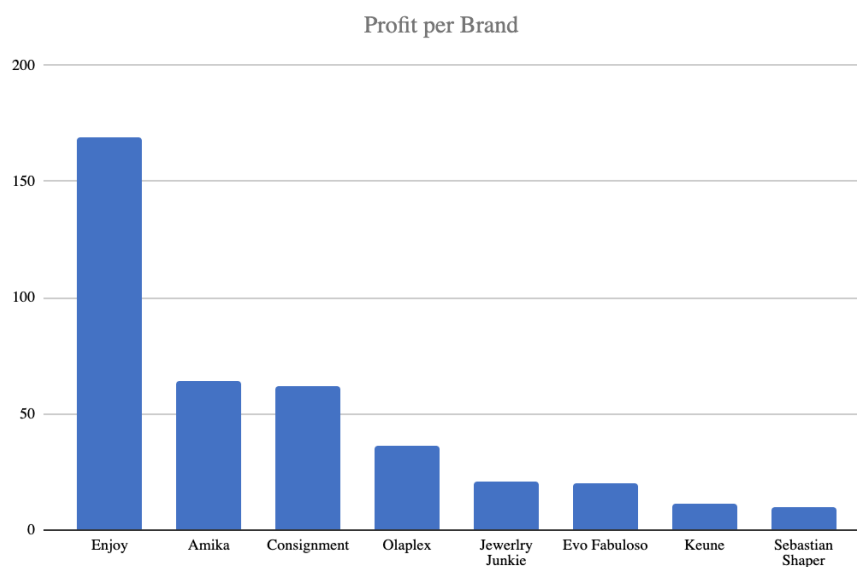


Figure 12: Breakdown of Profit per band in a Graphical Depiction

The goal of this macros Google sheet is to quickly generate trend data each month and season to determine what products should stay and what products should be rotated out of the salon. The trend data will also help show which products are bringing in the most profit per item which can help determine product placement. A user guide for how to use the macros google sheet is shown in Appendix #4.

In addition to the rotation of products based on trend analysis, the salon will be incorporating a system to incentivize customers to purchase more products. The team will be implementing a new strategy that will target the customers they are serving more directly by placing products that the stylists use on their customers within eyesight of the styling booth. As the stylist is finishing up the treatment of the customer, they will walk the customer through the hair care products that they used to make their hair look pristine. This will allow for the customers to get the same finish at the salon while at home. The idea is not that this will stop them from coming into the salon to get their hair done but to incentivize them to purchase more products. The great part about this idea is the ability to keep the product rotation plan in place. As new products enter the store the stylist can use these products on customers and implement the above strategy to boost sales of the new products. Another incentive to increase customers to purchase hair care products is the possibility of creating a sampler bag of hair care products used on them during their appointment. Katie could sell this sampler bag at a discounted price to push the customers to give these products a try at home. The guide for the product walks can be found in Appendix #5.

Long Term Solutions

The long term solution goal is to implement a new facility layout that differs from the current layout. The team created three solution designs to present to Katie. These three solutions were based on simulation results from the current state, relationship charts, and benchmarking from other local salons. One assumption the team did make is that Katie will be able to purchase the space the salon is in within five years, allowing her to implement any changes she would like. Currently Katie is leasing the space and the landlord does not allow for any major changes to the space.

Before creating the final state models the team created an accurate current state simulation using Anylogic. This simulation was able to mimic the monthly revenue that Katie generates on a month to month basis, which is approximately \$1700. This current state was created so that the team could find what rate of customers showing up was correct in Anylogic. The rate of .45 people per hour accurately represented the current state of the salon. Once the rate was found the team was able to focus on creating future state layouts so that simulations could be created for them.

Relationship charts break a facility into separate areas. These areas are then ranked next to each other based on their relationship to one another. This can be seen in the relationship chart in Figure 13.

REL chart:

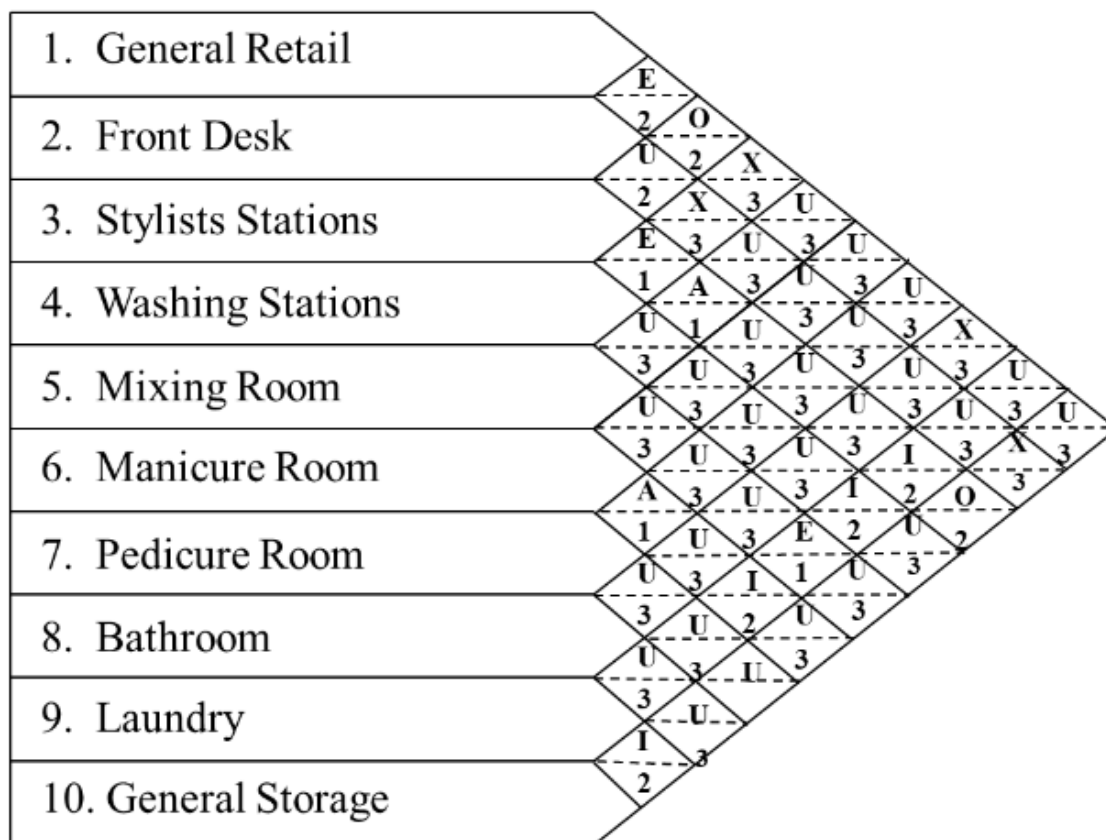


Figure 13: Relationship Chart

The chart is used to figure out which areas need to be placed next to each other instead of placing the areas next to each other at random. The scores seen above are based on feedback from Katie. The top score represents the type of relationship the two areas have with each other and the bottom score represents the reason why for the score. The meanings of the scores are represented in Figure 14 as well as Table 4.

Rating	Definition
A	Absolutely Necessary
E	Especially Important
I	Important
O	Ordinary Closeness OK
U	Unimportant
X	Undesirable

Figure 14: Relationship Ranking Meanings

Code	Reason
1	Frequency of use high
2	Frequency of use medium
3	Frequency of use low
4	Information flow high
5	Information flow medium
6	Information flow low

Table 4: Reason Codes

The relationship chart is used to lay out these scores in an easy to read format. For example, looking at the relationship between the mixing counter and the laundry room in Figure

15. There is a strong relationship due to the fact that the stylists use rags at the mixing counter which then go straight to the washer. Therefore, the need for the laundry room and mixing counter to be near each other is especially important. The reason code 1 was given to this relationship is because the frequency of use is high between these two areas.

REL chart:

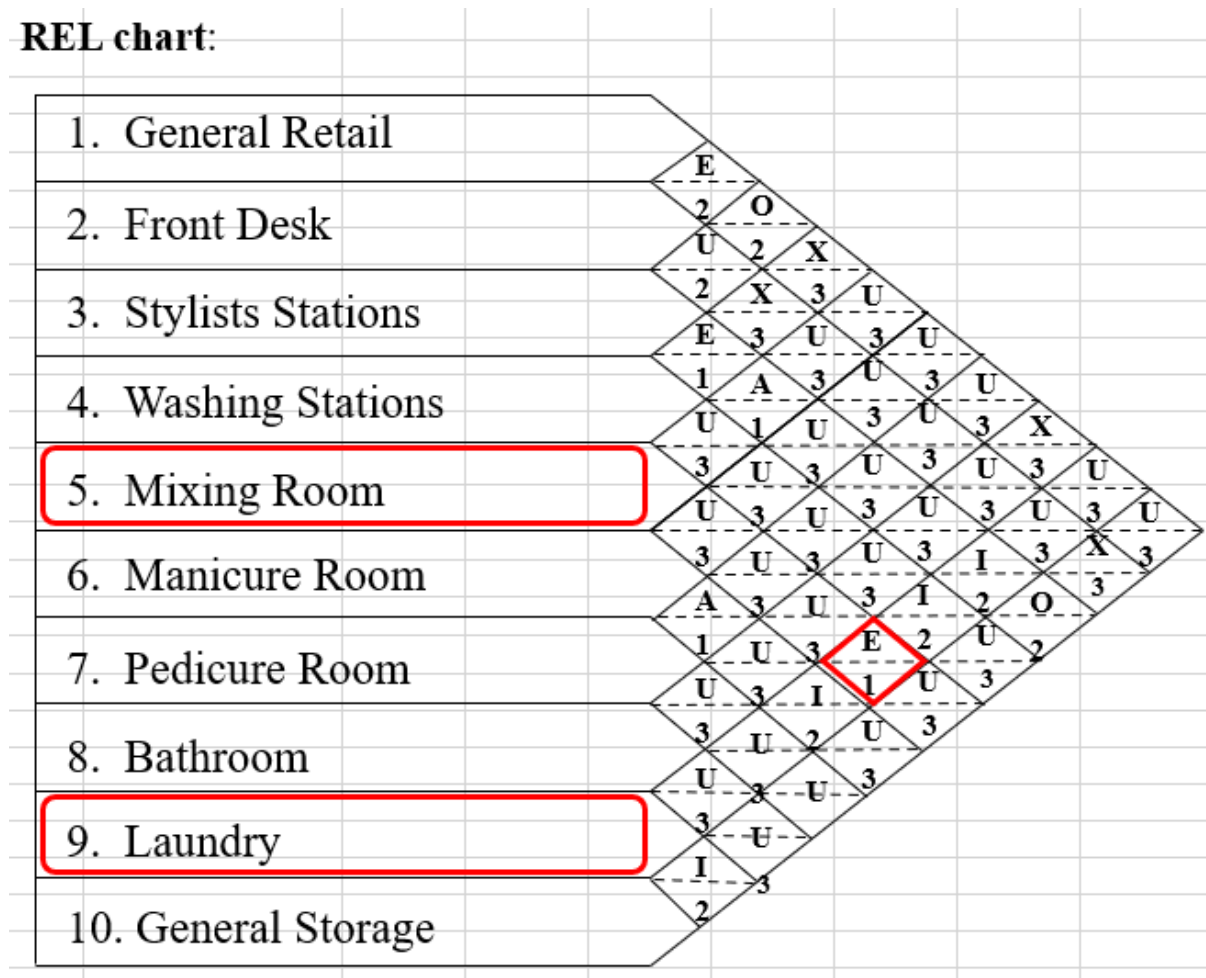


Figure 15: Example of How to Use the Relationship Chart

Once the relationship chart in Figure 13 is created it can then be translated into an easier to read/use format. The reason to translate the chart into Figure 16 is to make the calculation of the A Efficiency score easier. The A Efficiency score looks at the adjacency score, did these areas end up next to each other or not, and the max score represented by Figure 17.

Department	1	2	3	4	5	6	7	8	9	10
1		E	O	X	U	U	U	X	U	U
2			U	X	U	U	U	U	U	X
3				E	A	U	U	U	I	O
4					U	U	U	U	I	U
5						U	U	U	E	U
6							A	U	I	U
7								U	U	U
8									U	U
9										I
10										

Figure 16: Relationship Chart Translated into a Matrix

Department	1	2	3	4	5	6	7	8	9	10
1		4	1	-8	0	0	0	-8	0	0
2			0	-8	0	0	0	0	0	-8
3				4	8	0	0	0	2	1
4					0	0	0	0	2	0
5						0	0	0	4	0
6							8	0	4	0
7								0	0	0
8									0	0
9										2
10										

Figure 17: Relationship Matrix Converted to Scores

The scores seen in Figure 17 are based on Table 5 using a base of 2.

A	n^3	8
E	n^2	4
I	n	2
O	n^0	1
U	0	0
X	$-n^3$	-8

Table 5: Relationship Base Scores

Lastly the solutions were based on benchmarking completed by the team. The team browsed different local hair salons around the San Luis Obispo area as well as browsed some

layout designs online. The team found some notable design attributes that led to the 3 design solutions below.

Long term solution #1

The 1st long term solution design was based on the short term implementation blueprints in efforts to reduce the amount of work to implement these changes. The main changes to this solution include moving the washer and dryer to the back left represented in teal, the mixing room moving next to the laundry room and becoming a countertop represented in pink, the bathroom moving to the top right represented in yellow, the washing stations moved next to the laundry represented in red, the manicure/pedicure station next to the bathroom represented in blue, as well as an addition of retail represented in purple. The other pros to this solution include an addition of retail space of 221.833 square feet, adding one stylists station on top of the six currently there, and the feasibility of this solution is the highest. A con to this solution is that the retail is not visible from the stylists stations. From the literature review gathered, it was found that having retail visible from the stylists booths will help increase the likelihood a customer will buy a product. Therefore not having retail within the stylists stations view is a loss in potential sales. This solution can be seen below in Figure 18.



Figure 18: Future State Redesign #1

Department	1	2	3	4	5	6	7	8	9	10
1		1	1	1	1	1	1	0	0	0
2			0	0	0	0	0	0	0	0
3				1	1	1	1	0	0	0
4					1	0	0	0	1	1
5						0	0	1	1	1
6							1	1	0	0
7								1	0	0
8									0	0
9										1
10										

Figure 19: Future State Redesign #1 Adjacency Matrix

The matrix in Figure 19 was created by examining Figure 18 to determine which areas are next to each other. A score of 1 is given to areas that are adjacent, a score of 0 is given to areas that are not adjacent, and a score of -1 is given to areas that have an undesirable

relationship. To determine the A Efficiency score, the matrix in Figure 17 is multiplied with the matrix in Figure 19. The A Efficiency score also includes rewards for not placing areas with an X relationship, undesirable, next to each other. The A Efficiency score for layout 1 is 89.06%.

The scores are relative, meaning that 89% is good when compared to scores that are much lower than 89%.

Long term solution #2

The 2nd long term solution design was based on benchmarking that the team concluded. The goal of this solution was to create an open concept that allows for customers to travel around the entire salon at ease. The main changes to this solution include moving the washer and dryer to the back left represented in teal, the mixing room moving next to the laundry room and becoming a countertop represented in pink, the bathroom moving to the top right represented in yellow, the washing stations moved next to the laundry represented in red, the manicure/pedicure station next to the bathroom represented in blue, as well as an addition of retail represented in purple. This can be seen in Figure 20 below. This solution also looks at the stylists stations in a completely different way. Instead of having the stylists stations along the outer walls of the salon they are centered in the middle of the salon. Having the stations centered allows for the retail along the outer walls to be visible from the stylists stations. The pros to this solution include an addition of retail space of 118.875 square feet, adding three stylists stations on top of the six currently there, and the approval of the sponsor, Katie. A con to this solution is that the retail area does not grow as much as the other two solutions. This solution can be seen below in Figure 20.

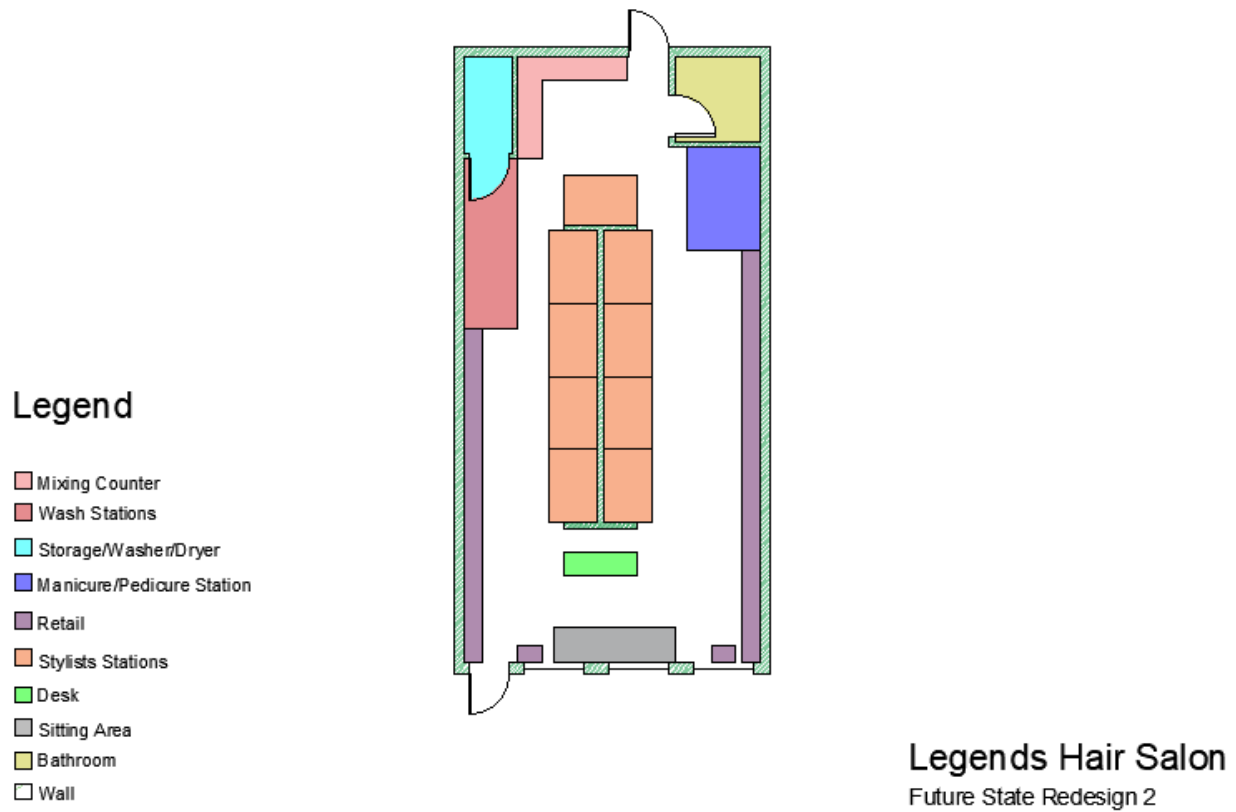


Figure 20: Future State Redesign #2

Department	1	2	3	4	5	6	7	8	9	10
1		1	1	1	0	1	1	0	0	0
2			0	0	0	0	0	0	0	0
3				1	1	1	1	1	1	1
4					1	0	0	0	1	1
5						0	0	1	1	1
6							1	1	0	0
7								1	0	0
8									0	0
9										1
10										

Figure 21: Future State Redesign #2 Adjacency Matrix

The matrix in Figure 21 was created by examining Figure 20 to determine which areas are next to each other. A score of 1 is given to areas that are adjacent, a score of 0 is given to areas that are not adjacent, and a score of -1 is given to areas that have an undesirable relationship. To determine the A Efficiency score, the matrix in Figure 17 is multiplied with the matrix in Figure 21. The A Efficiency score also includes rewards for not placing areas with an X relationship, undesirable, next to each other. The A Efficiency score for layout 2 is 93.75%.

The scores are relative, meaning that 93.75% is good when compared to scores that are much lower than 93.75%.

Long term solution #3

The 3rd long term solution design was based on benchmarking that the team concluded. The goal of this solution was to create a layout that was completely different from the current state as well as the other two solution designs. The main changes to this solution include moving the washer and dryer to the back left represented in teal, the mixing room moving next to the laundry room and becoming a countertop represented in pink, the bathroom moving to the top right represented in yellow, the washing stations moved next to the laundry represented in red, the manicure/pedicure station next to the bathroom represented in blue, as well as an addition of retail represented in purple. This solution also looks at the stylists stations in a completely different way. Instead of having the stylists stations along the outer walls of the salon they are clustered in the middle left of the salon. The other pros to this solution include an addition of retail space of 185.25 square feet, adding two stylists stations on top of the 6 currently there, and will produce the most revenue. A con to this solution is that the stylists stations are so cramped together and the floor plan is a closed layout instead of the preferable open layout. This solution design can be seen below in Figure 22.



Figure 22: Future State Redesign #3

Department	1	2	3	4	5	6	7	8	9	10
1		1	1	1	1	1	1	0	0	0
2			0	0	0	0	0	0	0	0
3				1	0	0	0	0	0	0
4					1	0	0	0	1	1
5						0	0	1	1	1
6							1	1	0	0
7								1	0	0
8									0	0
9										1
10										

Figure 23: Future State Redesign #3 Adjacency Matrix

The matrix in Figure 23 was created by examining Figure 22 to determine which areas are next to each other. A score of 1 is given to areas that are adjacent, a score of 0 is given to areas that are not adjacent, and a score of -1 is given to areas that have an undesirable relationship. To determine the A Efficiency score, the matrix in Figure 17 is multiplied with the

matrix in Figure 23. The A Efficiency score also includes rewards for not placing areas with an X relationship, undesirable, next to each other. The A Efficiency score for layout 3 is 76.56%. The scores are relative, meaning that 76.56% is bad when compared to scores that are much higher than 76.56%.

Long Term Implementation Plan

As the project wraps up the team will be supplying Katie with a folder of resources that she will be able to use throughout the coming years. Some examples of resources in this folder are CAD and simulation models, the retail analysis dashboard, and any other files used for analysis throughout this project. Once Katie has this folder she will be able to continually analyze her retail sales to potentially improve them as time goes on. With her retail analysis under control she can focus on generating enough revenue to purchase her salon location from her landlord. Once this task is completed the remodels necessary to implement Solution 2 can be performed. She will be able to give the CAD models to contractors so that they can perform the remodels to the accurate dimensions. The required resources for this implementation are continuous use of the retail dashboard, as well as the lumber and electrical material needed to remodel the salon.

5. Test and Evaluation of Design Alternatives

To understand the current situation in the salon and analyze what areas were selling the most, the team conducted a color coding experiment in which the salon was broken up into four different zones that all had retail sold inside of them. The point of breaking up the salon into these zones was to see where the most foot traffic and product sales were being conducted. To ensure fairness in the experiment, each zone had the same brands so that someone wasn't prioritizing a specific brand and each area was accurately represented. Once the zones were broken down the team put colored stickers that correlated to the specific zone (Purple, Red,

Yellow, Green). For the next three weeks, Katie logged each product that was sold and tracked what zone the item came out of. The team stopped by the salon three weeks later to check up on the progress of the experiment and found that the Red and Purple zones were the areas with the most product sales.

As seen in Figures 24 and 25, the salon sections were broken up by color coding and each product sold from the sections was tracked using a tally system.

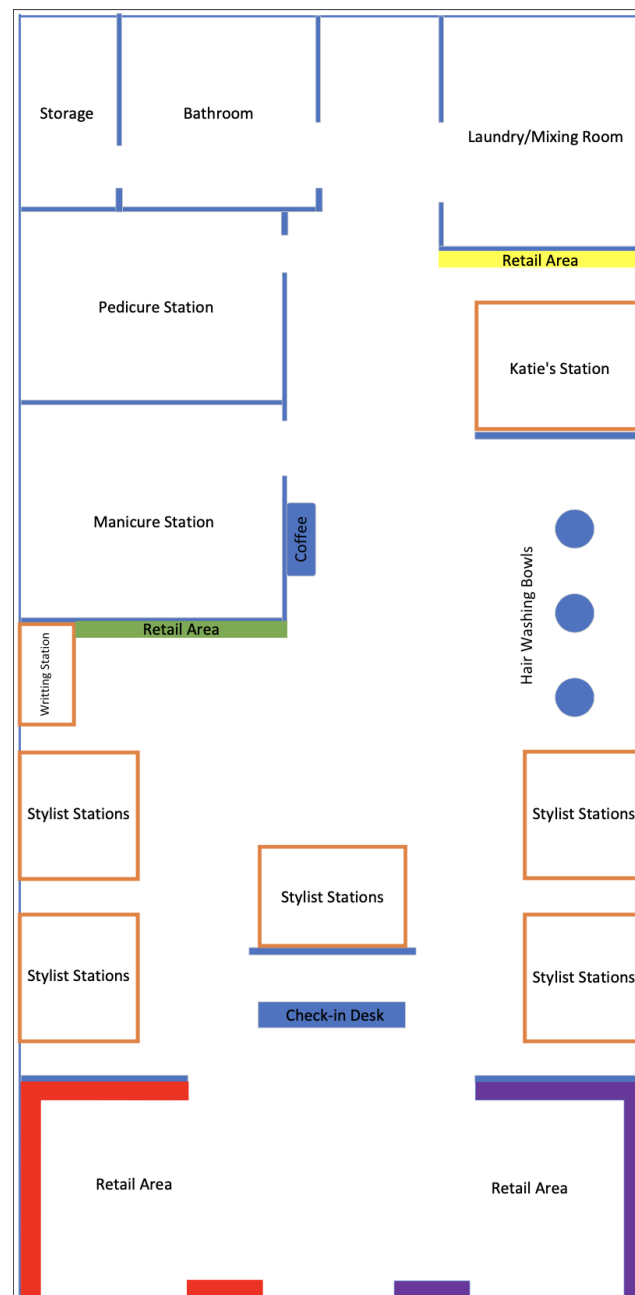


Figure 24: Breakdown of the Different Zones of the Salon

red	14
green	4
yellow	2
purple	8

Figure 25: Tally of Products Bought from each Section

The dynamic system that the team will be suggesting for the future is based on zoning the salon into four sections. The most popular products sold at the salon were the products that were placed as soon as a customer walked in. It is known that people who are coming in for a popular item, such as an Enjoy product, come straight into the store and grab the Enjoy at the front of the store without walking through the salon to explore other items. To increase foot traffic throughout the store and sales of other products, the team placed the more popular items in the zones that were located in the back of the store. The conclusion that came from this test was that people still traveled to the back of the store to purchase those items. Concluding that the salon should keep an eye out for the most popular products, monthly, to locate them in the back of the salon.

After implementing the layout changes for three months, a t-test was run to see if the changes made were significant. The test was run with the retail sales data from February - April in both 2021 and 2022. Once run, the test showed a P-value of 0.036. Since this value is less than 0.05, it can be concluded that the layout changes produced significant differences in the retail revenue. The statistical analysis and boxplot can be seen below in Figure 26 and Figure 27.

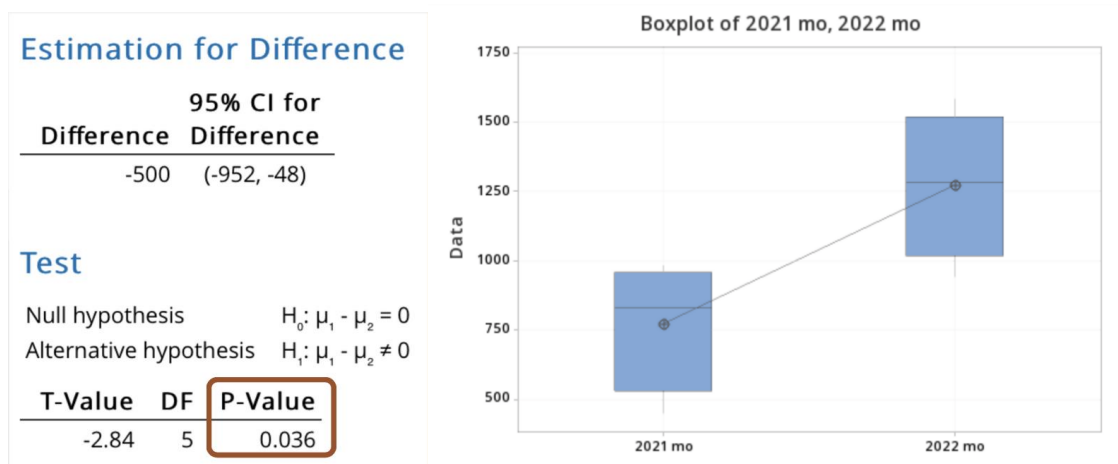


Figure 26 & 27: Statistical Analysis on Facility Layout Changes

Once the team had the final layouts completed, it was time to create simulations for each of the layouts to perform analysis on their functionality. In total there were four simulation models created, the current state as well as the three future state models. For the future state models, the first step was to see how much revenue could be created by each of the models using the current rate of .45 people per hour. Table 6 below shows the results from the simulations given the .45 rate and running the simulation over a month long period. The current state revenue of \$1,700.43 is right on track with what Katie generates per month. From the table it can be seen that all of the future state layouts are able to generate more revenue than the current state, with future state 3 being the model that generated the most revenue and had the lowest average time for total cut. Those two metrics are what the team was focused on improving throughout the creation of the new models and the decision of which model is the best. By having all of the future states generate more revenue and have a lower time for total cut, the team verified that the future state layouts were improvements from the current state.

Simulation (All with same rate)	Revenue (\$)	Time for total Cut (min)	Time to Buy (min)	Time waiting for Dryer (min)	Time waiting for Stylist (min)	Time to check in (min)
Current	\$1,700.43	85.792	5.76	0.57	5.112	1.524
Final 1	\$1,746.48	84.436	5.816	0.214	5.01	1.544
Final 2	\$1,718.80	84.352	5.82	0.368	5.046	1.556
Final 3	\$1,832.69	83.93	5.792	0.268	4.978	1.51

Table 6: Simulation Results with .45 Rate

After focusing on the current rate the team wanted to see how many people the simulation could handle before it broke, which was represented by customers flooding into the simulation and not being attended to. Table 7 shows the results of these simulation trials, with the main columns to focus on being the Rate, Revenue, and Gap. Final state 1 was able to handle the most people with 618 customers served in a month and final state 3 was the worst with 529 in a month. These numbers directly correlate to the amount of revenue brought in. Additionally, the future state desire was to have \$500/ sq ft of revenue which translates to a revenue of \$51,041.67 a month for the salon. The difference of the revenue generated and the desired revenue was taken to find the gap between the two. With this gap the team was able to determine if any of the final state models could possibly deliver the desired five-year revenue per square foot. Future state 1 was able to generate a profit between the desired revenue and the revenue brought in while both of the other options were unable to do so. However, future state 2 was only \$170 short so it is still a viable option to reach the desired revenue per month. From these simulations, the team was able to determine which future state layouts could achieve the five-year goal, which were future state 1 and 2.

Simulation	Rate	People	Amount of people that got haircuts	Revenue	Average Price of Haircut	Revenue from Haircuts	Desired Revenue /m	Gap
Future 1	2.5	618	500	\$9,400.35	\$90	\$54,400.35	\$51,041.67	\$3,358.68
Future 2	2.4	580	472	\$8,392.35	\$90	\$50,872.35	\$51,041.67	-\$169.32
Future 3	2.25	529	418	\$8,200	\$90	\$45,820.00	\$51,041.67	-\$5,221.67

Table 7: Simulation Results with Maximized Rate

After the simulation results had been recorded the team focused on using a MCDA to help determine which solution would be the ideal design. Table 8 shows the team's MCDA for future state designs. The columns that had the highest weights, at a value of 10, were Maximize Revenue, Increase Retail Space, and Sponsor Approval. For the Maximize Revenue column that value was taken from the simulation results. For the Increase Retail Space column, the team performed calculations to find the overall increase in square footage. As for Sponsor Approval, this is a heavily weighted column because if the sponsor doesn't like the solution design then they won't be motivated to implement it. After the calculations had been done, Solution 2 was the most favorable decision according to the MCDA, with a total of 543.

Criteria	Maximize Revenue	Increase Retail Space	Increase Retail Visibility	Increase Customer Comfortability	Feasibility of Implementation	A Efficiency Score	Increase in Stylist Stations	Sponsor Approval	TOTAL
Weights	10	10	7	5	9	8	9	10	
	8	10	7	5	9	8	6	7	
Solution 1 - Switch Mixing Stations with Bathroom, Switch Washing Stations with Manicure/Pedicure	This layout will be similar to the current layout which we believe can limit flow of customers, but this layout does have more retail space increasing the probability of a purchase	The increase in retail space would be 221.833 square feet	With this layout the customers will be able to see more retail while they are getting their haircut/styled. The sitting area also allows for customers to be closer to retail while waiting.	This doesn't increase from the current layout where there is one waiting area for customers.	The feasibility of this layout is high if Katie owns the salon. Minimal walls will need to come down making it less work for Katie.	A Score of 57. An Efficiency Score of 89.06%	This layout will have 7 Stylists Stations which is an increase of 1 station from the current layout	Katies liked this layout because it did not require as much work to implement this layout	523
Solution 2 - Move Stylists Stations to Center of Salon, Retail Along the Outer Walls, Switch Mixing Stations with Bathroom, Switch Washing Stations with Manicure/Pedicure	This layout allows for a better flow of customers that are all looking at retail while getting their haircut increasing the probability of a purchase.	The increase in retail space would be 118.875 square feet	Having the stations centralized within the salon allows for retail to be placed along majority of the salons length. With the retail behind the booths the customers can look at the retail in the mirror the entire time they are getting their haircut	This doesn't increase from the current layout where there is one waiting area for customers.	The feasibility of this layout is less than the first solution. Katie would have to add a whole new wall in the middle of the store to make this solution work. Katie would also have to add all new shelving along the length of the salon	A Score of 60. An Efficiency Score of 93.75%	This layout will have 9 Stylists Stations which is an increase of 3 stations from the current layout	Katie like the possibilities that are available with this layout. She said that this layout was her favorite	543
Solution 3 - Switch Mixing Stations with Bathroom, Switch Washing Stations with Manicure/Pedicure, Add Wall at Front of Store, Have Stylist Stations on Other Side of New Wall	This layout makes the flow of the salon cluttered not allowing for clear visibility of the retail. This will decrease the probability of a purchase.	The increase in retail space would be 185.25 square feet	This layout does not increase visibility of retail since the stylist stations are more clustered. This makes it harder for people to see retail in the mirror unless they are in the far right stations.	This solution increases the amount of sitting area for customers at the front of the store by (Square Footage).	This layout has the smallest feasibility due to its tight corners and small amounts of space. Katie would have to put up five new walls to make this solution happen.	A Score of 49. An Efficiency Score of 76.56%	This layout will have 8 Stylists Stations which is an increase of 2 stations from the current layout	Katies did not like this layout as much since it felt more cramped. She also felt this layout was a lot of work that could take too much time and effort.	462

Table 8: MCDA for Long Term Solutions

6. Impact Analysis of Proposed Solutions

Public Health, Safety and Welfare

For the proposed solutions a lot of the focus of the impact of the design changes/remodels has been solely to increase the revenue per square footage. This is done through strategic product placement and changing the flow of the salon to encourage customers to purchase items. However, when someone goes to get their haircut they should not feel like they are being pressured to buy items or that their whole trip is focused around buying new products. Many people want to enjoy the overall experience of getting their haircut and the ambience of the salon can play a big factor in the customer's experience. With these thoughts in mind, the solutions can not solely be measured on their revenue impact but instead their impact on the customer experience.

In regards to the health and safety of customers that come into the salon, one of the initial improvements is the ease of mobility for customers walking around the salon. By opening up the entrance of the salon, and centralizing the check in desk for the store, customers have much more

space to spread out and don't have to worry about congregating next to each other. This benefits customer health by creating social distancing between the customers without having it be forced. People generally would enjoy having their own personal space in a store because this helps prevent the spread of illnesses and can prevent collisions with items or individuals. By creating a space for customers to walk around the salon that is not congested or crowded, many injuries and broken items can be prevented.

As for the societal and cultural impacts of the solutions, there are a couple specific changes that benefit these factors. The first change that was made, from a societal standpoint, was moving the pedicure station out from in the middle of the salon floor into its own private room. While most pedicures are done in the open in a traditional nail salon, having this private area for a customer to get a pedicure can be comforting. Having separate areas for people getting their nails done/hair done separates the two environments so each one can be focused on what they want. Additionally if someone doesn't like the smell of nail polish/hair spray or the sight of feet this ensures that when customers arrive they are in their own section based on what they would like done. The second change is for both Katie and the customer as her station took the spot of the pedicure station in the back of the store. For Katie, this is beneficial as she now has a viewpoint from the back of the store and she can observe everything that is happening in her salon. From a customer perspective this shows authority because Katie is not working at the same stations that the other stylists are at, instead she has her own area where she can work.

Environmental

It has been noted that Americans throw away more than 12 million tons of furniture a year and 80% of that ends up in landfills. In addition to this, building new wood furniture causes deforestation but plastic furniture is not biodegradable and typically ends up in the ocean. Two ways to eliminate these problems would be to repurpose materials or furniture already owned, or

buying used furniture locally. In this case, Katie had a few pieces of wood from previous projects that could be turned into retail shelving. She was also tasked to regularly check facebook marketplace, yard sales, or other local markets to find tables that could be used in the front area for retail and product displays.

Economic

For the short term solution of the salon, Katie will be required to buy some tables and shelves to increase her retail space. She will be buying used tables from Facebook Marketplace to reduce costs and because the older tables will match the style of the salon. This will cost her about \$100 to add a few more tables. She also will be buying basic shelving that consists of a slab of plywood and a few L-brackets to hold up the shelves. Once again, this will cut costs of the new shelving, especially since the shelves will not need to be aesthetically pleasing, as they will have retail on top of them. This should cost no more than \$100 to purchase.

The long term solution is where the economic factors are greatly increased. In the future, the team assumes that Katie will have full ownership of the salon space. It will cost a lot of money to do a full remodel of the salon, moving plumbing, electricity and some walls.

Key Performance Indicators Analysis

The KPIs used to measure the impact of the proposed solutions include work space, retail space, and retail revenue per square foot. The short term solutions validation will be verified based on these metrics and how they perform before and after implementation. Work space includes any areas inside the salon in which a stylist needs to use to perform work duties. Before the implementation of the short term solution, the work space included six stylist stations and room for two stylists to mix at once. After implementation, the amount of work space stayed the same because this is not the main focus of the short term solution. Retail space allows for Katie to increase her revenue by allowing her customers to select from a wide variety of items. One of the main goals after the short term implementation is to increase retail space. Before the desk

was moved the retail space included an area of 48.75 square feet. After the desk was moved, retail space increased to an area of 78 square feet. This is a 62.5% increase from the start of the project. Retail revenue per square foot is one of the main focuses of the project because retail makes up for 48% of total revenue. Before the short term implementation, the salons retail revenue per square foot was \$2.15 per square foot, which can be seen represented in Figure 28. After the desk was moved and retail space was increased, the retail revenue per square foot was increased to \$3.47 per square foot, which can be seen represented in Figure 29. The retail revenues per square foot calculated below, are for a two month period from February 1st to May 1st. This is one year before implementation to a two month period after implementation. Within those two months the salon saw an increase in retail revenue per square foot of 62%.



Figure 28: Retail Revenue Per Square Foot Before Short Term Implementation



Figure 29: Retail Revenue Per Square Foot After Short Term Implementation

7. Conclusions and Recommendations

For the long term recommendations, the second design was chosen as the best option. Although the third solution gave the best results in the simulation, the second solution's revenue was only \$100 less for the month and Katie preferred the second design over the third. Additionally, from the maximum rate simulations the team knew that the second design solution is capable of meeting her 5-year revenue goals while the third design was unable to meet the 5-year revenue goal so it was taken out of consideration. According to the simulation, she would make \$1,718.80 per month which, excluding the stylists rent. This solution also allows for Katie to increase her staff size as for the increase in 3 stylists stations from her previous 6. These factors are the reason why future design state #2 was chosen.

In order to stay on track with this goal, Katie will need to use the google sheets macro and data studio dashboard to keep up with her sales. On the first of every month, she will run the

report for the previous month and assess her sales. As these solutions get implemented there will be a much clearer way to visualize what products are selling the best as well as what products are generating the most profit. While the primary goal is to focus on increasing revenue per square foot, Katie will benefit from knowing what products are generating the most profit.

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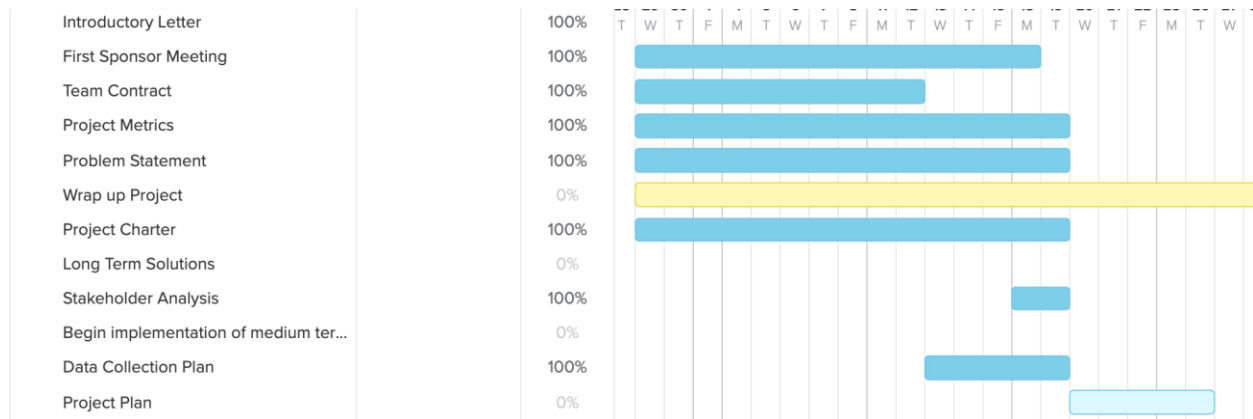
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APPENDICES

1. Trello for project management tool for the duration of the senior project. Both the initial and the in-progress or completed plan including analysis of the project management aspects of the project.



2. Client Communication Analysis

The team primarily used text and email to communicate with Katie. She was very prompt in her replies and email communication worked great for sending over documents and ideas. The team also went to the salon multiple times a quarter to do time studies, observations, and talk to some stylists about their experiences. Overall, the communication methods were effective and allowed the team to gain all the information we needed from our sponsor.

3. Teamwork Analysis

As a team we worked really well together and grew a lot as friends through our many different bonding opportunities throughout the quarter. We have been friends since freshman year so we already had a good base for communication and are comfortable working with each other so this quarter was just solidifying that fact. We work well as a team because we build off of each

other's work and know each other well enough to know each person's strong suit. This helps us delegate what work each person will do for the week and helps us manage our workload.

4. User Guide: [Tutorial Video](#)
5. Product Walkthrough: [Document](#)