Lean Restaurants: Improving the Dining Experience

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Myriad examples exist to describe how lean concepts are applied in the manufacturing and healthcare industries; however, research regarding how lean is applied in the food service industry is sparse. The purpose of this case study is to discover how lean applications are currently being applied in three different full-service dining establishments located in Knoxville, Tennessee.

INTRODUCTION

The concept of lean has been discussed previously in published works with regard to the restaurant industry, such as (1) creating a leaner menu by offering healthier meals or (2) by offering the consumer a computerized menu vs. the standard menu, or (3) claiming "lean" on food labels, or (4) facing tough, lean economic times, or (5) keeping a lean supply chain, and (6) how food service equipment manufacturers apply lean principles to name a few; however, there is scant research on the actual application of lean techniques in dining establishments. A case study consisting of three distinct restaurants located in Knoxville, Tennessee examines the various applications of lean and their associated benefits for each of these entities. The three restaurants include a full-service theme restaurant, Braziero's, a Brazilian steakhouse; a full-service American-style restaurant in the heart of downtown Knoxville, Café 4, which serves Southern comfort foods; and a country club restaurant, Cherokee Country Club, one of Knoxville's oldest and most elite country clubs.

LITERATURE REVIEW

During the past thirty years there has been an increasing consumer voice in having dining establishments and food service providers offering healthier foods and disclosing nutritional content information in the foods they prepare. Restaurants and diet programs provide ample evidence that food service providers are listening to their customers. For example, McDonald's first introduced healthier foods such as salads and leaner burgers in the early 2000s (Arndt, 2004; Norman and Chin, 1989). On their current menu is a new product, the McWrap, which consists of lettuce, spring greens, sliced

cucumbers, tomatoes, and cheddar jack cheese as a fresh alternative to healthy offerings by their competitors (Burfield, 2013). In addition, lean bison burgers were listed on restaurant menus years ago as a low-cost alternative to beef (Anderson, 2006).

Subway restaurants serve healthy made-to-order submarine sandwiches by using fresh ingredients, reducing or eliminating trans-fats in the menu, and serving products low in fat, calories, and sodium (Staff, 2013).

In the multi-billion dollar diet-program and weight-loss industry, NutriSystem utilizes both celebrities and testimonials from customers to market their pre-packaged, pre-portioned, low-calorie meals (Patton, 2011; Kiley, 2005). Food manufacturers also use various dairy-based ingredients in drinks to target illness prevention and to increase lean muscle mass (Miller, 2005).

(Norman and Chin, 1989) discuss streamlining information via a dynamic computerized restaurant menu as opposed to the traditional static restaurant menu. Whereas traditional restaurant menus offer advantages such as breadth, richness, and graphic layout in addition to the server acting as a natural menu support system, computerized menus offer advantages such as ease of user interface, instant menu variety, and portability.

The Food and Drug Administration (FDA) has expanded the use of 'Lean' on food labels to include "mixed dishes not measurable with a cup." (FDA Consumer, 2007). The Labeling Education and Nutrition Act (LEAN) require chain restaurants to disclose nutrition information on their menus (Fata, 2009). Additionally, consumer groups, among others, have petitioned the USDA to require ground beef suppliers to include information on their labels if lean, finely textured beef (LFTB) is contained in their products and they have also petitioned the FDA to require labeling when a genetically engineered plant or animal is used in a food product (Food Engineering, 2012).

Lean has been used in the financial world to describe tough, economic times in which restaurants and all industries, for that matter, have endured since the Dow Jones Industrial average fell nearly 400 points on Black Monday in late 2008 (Frumpkin, 2008; Lukianoff, 2011) opines that proper pricing is key to surviving lean times by managing costs and educating and incentivizing managers to increase profit, not lower it.

Regarding the use of lean in supply chains, (Wood, 2004) suggests employing the Five Principles of Lean Thinking (specify value, identify the value stream, making value-creating steps flow, implementing a "pull" value system, and striving for perfection) developed by (Womack and Jones, 2003) to systematically drive out waste by designing better ways of working, improving connections, and easing flows within supply chains.

In a government-funded research study between the UK and Argentina beef foodservice providers, wastes in the supply chain were exposed by both parties. Whereas UK wastes generated by legislative, market structure, and competitive issues such as high cost of land, labor, and machinery and its associated burden of paperwork inhibits the UK's ability to compete with the low cost structures of countries like Argentina, Argentine wastes include: 1) lack of capital for investment due to depressed economic conditions and 2) unfilled container loads ordered by the UK due to unavailability of cattle of appropriate weight and confirmation specification (Francis, et al., 2008).

Foodservice equipment manufacturers utilize lean techniques to streamline production operations. For example, The Millwork Company (TMC), a manufacturer of branded restaurant fixtures and components, employs a U-shaped production flow, which includes two distinct machining lines – straight and contoured components – that feed directly into a single assembly line. By combining this idea with producing parts in small batches that travel together down the production line, TMC was able to increase shipments from 65 millwork packages per month to more than 100 millwork packages per month, thus, achieving 100% on-time delivery with no backlog (Koenig, 2006).

Cadco Ltd., a producer and marketer of commercial and industrial food service products, employed lean to simplify the warming tray line (a bottleneck) by leaving the plastic adhesive paper on the warming tray to save assembly time on the production line and better protect the product, thereby eliminating an unnecessary step in the production process. This enabled Cadco Ltd. to improve production output from 150 units per 10 hour day to 240 units per 8 hour day (Management Services, 2006).

In a case study of a food contract manufacturer, the use of value stream mapping maps the flow of materials and information and also identifies both value-added and non-value-added activities, thereby exposing waste in the form of surplus inventories. In this same study, the use of demand-amplification mapping indicated that the production of smaller batch sizes would decrease the end-product inventory level and increase customer response flexibility (Lehtinen and Torkko, 2005).

(Sullivan, 2009) suggests that lean and green applications can be applied to the training process by converting current print materials such as training manuals, handouts, job descriptions, recipes, etc., to electronic versions as well as with equipment by adopting Energy-Star compliance such as turning utilities and PCs off when not in use, keeping shades closed during the hot summer months and open on sunny days in the winter, and by keeping food service equipment well-maintained.

In a restructuring of campus dining services at the University of Colorado – Boulder, where Italian Cibo is one of ten themed restaurants, efficiencies are gained by locating storage coolers near most stations to ensure fresh restocking ingredients are conveniently available. Cooler doors automatically log temperatures and RFID is used to log the location of individual pans and items when they are thermally scanned (Lawn, 2011).

METHODOLOGY

The research in this case study involves an active research approach that includes interviews with the principals and interactions and observations with the employees of three dining establishments. These restaurants are mainstays in Knoxville that provide a unique sit-down dining experience because each dining establishment caters to a different clientele.

In each organization, the researcher interviewed either the owner (if privately-owned) or the general manager (if publicly-owned) and obtained permission to interact with all workers and observe their work methods over a four-week period. The researcher then associated employee activities to lean concepts and offered recommendations for improved performance by suggesting additional lean tools that each firm can incorporate in their restaurant operations.

Potential research limitations include the veracity of statements in face-to-face interviews and interactions with the principals and employees in the study. For example, those interviewed may only divulge what projects them in the best light or divulge only what they think the researcher expects to hear rather than providing a completely accurate response, therefore, creating bias in the results. A second potential limitation is that subjects may exhibit only their best behavior rather than normal behavior when being observed by the researcher. Again, this may bias the results. A third potential limitation is that the sample size is small – three restaurants, thus, the results may not reflect other applications of lean that are currently in use in the restaurant industry. A fourth research limitation is that cause-and-effect relationships are not explored.

CASE STUDY

Cherokee Country Club–Knoxville, Tennessee

Background

Cherokee Country Club has been one of the top country clubs in Knoxville since its inception in 1907. It has all of the amenities normally associated with a prestigious country club. There is a swimming pool, tennis courts, golf course, ballroom, and, of course, fine dining. The researcher decided to focus on the banquet side of the country club since the research focuses on lean applications in the restaurant industry. Numerous lean applications were discovered here.

Results

Banquets at Cherokee range in size from 50 guests to over 700 guests for a single event. Planning for events can be quite hectic and stressful affairs, particularly for large events with very specific details. The

process is basically the same for each banquet; however, the variation in size can mean a large spike in busy work. When workers come in to set up for a banquet there are multiple tasks that must be performed. One task is to clean and polish silverware so that it is ready to be set on the table. Next, water glasses must be polished and be table-ready. The workers group necessary silverware for each table setting into a clean glass; thus making a kit, which allows the worker to easily transport the necessary table setting to its designated table. Plates also must be laid out in the correct format for table setups, which includes bread and butter plates. Napkins must be folded according to the correct procedure, which may change depending on the event details. Finally, to complete the banquet set up, the necessary decorations must also be assembled and ready for the table setting. This process can change considerably from event to event due to the variety of preferences from different event hosts.

Whereas all table setting preparations must be completed prior to the arrival of the first guest, issues occasionally arise that make table setting a challenge. Staffing, training, and communication issues were most prevalent. For example, unpredictable sudden changes in the size of events may not allow sufficient time to coordinate staffing requirements and lead to over- or under-staffing issues. In addition, there may not be enough time to allow for adequate training of new or temporary employees which lead to instances whereby workers did not know precisely what to do. Lack of or inadequate training led to work slowdowns in order to remedy work that was performed incorrectly or not at all. There were times when confusion reigned regarding exactly what needed to be done for a specific event.

Discussion/Implementations

The researcher recommended to the owner and staff further employment of lean concepts to help eliminate waste and improve efficiency in the banquet setup process. This consisted of reducing downtime for training of new employees, standardizing the setup process, and providing a method for calculating an adequate number of employees which may vary with the size of the event. The anticipated benefit of such improvements include optimizing utilization of setup staff, thus reducing overall labor cost.

For example, new employee training is typically conducted by current employees while the table setup process occurs. This traditional form of on-the-job training essentially causes two employees to do one task during that training day which doubles the cost of labor for this important function. Wastes associated with training can easily be remedied by providing all new employees with a training manual. This manual would consist of every single task that must be completed for the table setup with detailed instructions on how to complete that task. Pictograms would be added to aid the new worker in visualizing the table setting process and eliminate mistakes. This manual would help new hires and temporary workers learn a standardized setup process while freeing regular full-time servers to perform other required banquet tasks.

During the setup of a banquet, each task must be completed in a prioritized order. Currently all of these tasks are memorized by the more experienced employees and performed at random. A list of all tasks, along with the names of servers responsible for each task depending on the size of each banquet, could be compiled into a banquet setup task sheet, or checklist. That is, whereas some (fixed) tasks (i.e., placement of clean tablecloth on each table) must be completed for every banquet, other (variable) tasks (i.e., selection of accoutrements) are completed only by request of the guests. Both of these can be included in the master task checklist, but the variable tasks will have checkmarks next them if they must be included. Clearly defined roles help employees to focus on their assigned tasks and helps managers to identify which employees need improvement.

In order to determine the precise number of employees to staff for a particular banquet, the total estimated table setup time must be known. Time studies were taken of all of the various tasks from folding napkins to polishing glasses. These time studies were taken for preparation for just one guest. This result could then be multiplied by the anticipated number of guests to obtain the total estimated table setup time. Simultaneous tasks were also considered when developing a total setup time. Any statistical software package (Excel was used in this study) can be used to develop a regression model with total setup time as the response variable and using predictor variables such as number of guests, arrival time

before event begins, type and degree of difficulty of decorations such as type of napkin folds, to name a few. The regression model can provide management with information regarding key parameters such as total estimated banquet setup time, number of employees required, etc., to better estimate labor costs and more effectively utilize the staff it has on hand.

Brazeiros Churrascaria Brazilian Steakhouse– Knoxville, Tennessee

Background

Brazeiros Churrascaria is an authentic Brazilian steakhouse located in West Knoxville. During the time of this research, the restaurant had been in business for two years. The researcher's primary source of contact was the Owner and President, Vilmar Zen-Zen and Adam Watkins, Bar Manager (Zen-Zen and Watkins, 2014), who credits Brazeiros' application of lean techniques for enabling Brazeiros to provide a traditional Brazilian steakhouse experience at far lower prices than its competitors. Brazeiros' principal idea is to offer guests a two-course meal in an all-you-can-eat format and to provide this meal in an efficient manner, leaving guests feeling as though they are receiving outstanding service that traditional buffet meals do not offer. Guests are seated when they arrive and the server explains the meal ordering system in which guests are given cards with red and green sides. These cards serve as Kanban cards and they signal to the servers and "Gauchos" (cooks) that they would either like meat service (green card) or not like meat service (red card).

Brazeiros' 6-step dining experience is as follows:

Step 1: Brazeiros Beverages

Guests are invited to order one of Brazeiros' authentic domestic or international Brazilian specialty drinks or choose from an extensive wine list.

Step 2: Salad Bar

Brazeiros offers over 20 different items on their salad bar, including fresh cut vegetables, imported cheeses, cured meat, and gourmet salads.

Step 3: Meat Selection and Coaster Card

All guests are provided two-sided coaster cards. The green side signals to the Gaucho chef to begin table-side service. The red side signals to the Gaucho chef that the seated guests are taking a break from table-side service.

Step 4: Meat Delivery and Carving

Brazeiros offers 12 different cuts of meat for guests to choose from. Individual guests turn the coaster card to red to signal to the Gaucho chef that table-side service is not presently needed and they turn the coaster card to green when they are ready for more sizzling meat to be delivered to the table. Gaucho chefs only stop delivering to the table when all cards at the dining table are turned to red and the check is requested.

Step 5: Side Dishes

All guests are served traditional specialty Brazilian side dishes with free replenishments until all cards at the table are turned to red.

Step 6: Coffee and Dessert

Guests are offered coffee and a wide array of house specialty Brazilian desserts from which to choose to complete the authentic Brazilian dining experience.

Results

Visual Management and 6S:

Brazeiros implements visual management and the 6s system in nearly every aspect of its business. Visual management is used by employing two-color Coaster cards, which signals to Gauchos (or chefs) when food is to be served. This also allows chefs to service only the tables that desire meat cuts, meaning having fewer workers on the floor at one time. They use visual management to label salad dressings so that it is less likely for a customer to discard salad due to a salad dressing mix-up, thus saving the restaurant: 1) time to replenish the salad bar and 2) money through wasted food. The back of the house

employs visual management via the labeling of seasonings to again reduce the likelihood of mix-up and wasted inventory. Visual management also guides guests to the restroom in the form of clearly marked and visible restroom signs, cutting down on salad bar area congestion, and resulting in faster turnover time for tables.

The Lean concept of 6s is employed in the kitchen and bar areas, where both work areas are laid out in a way in which servers never have to come into the cooking area where the meats are being cooked or in the bar where drinks are being made. This allows for better traffic flow and reduces the probability of accidents caused by over-congestion. All inventory and supplies within the restaurant have a specific storage place and are labeled so that all employees know exactly where specific supplies should be. The restaurant is kept very clean and each section is completely "broken down" and cleaned every night, thereby reducing tripping hazards and keeping the place aesthetically pleasing to the dining customer. Safety is the number one priority at Brazeiros and all employees are required to wear non-slip shoes. Employees in the back of the house (the dishwashing area) are required to wear padded non-slip pads on the bottoms of their shoes in order to reduce wear on employee's knees and joints and also to prevent them from slipping.

Kaizen:

While Brazeiros has never had a formal Kaizen blitz, they do implement some of the ideas behind it. Every month the servers and chefs have separate meetings with management as a group to discuss any problems that may have arisen, discuss upcoming events, and discuss suggestions from either employees or customers to better improve service, work processes, and the overall work experience. These meetings also serve as a means for helping new team members by dissecting their respective jobs and suggesting labor-saving techniques in order to make their jobs easier and the tasks that they perform more efficient.

Poka-Yoke:

In a traditional restaurant, many mistakes come from servers taking down the wrong order or the chefs making the order not quite to the customer's preference. These errors are virtually mistake-proofed at Brazeiros because the servers only take orders for the drinks and the chefs come around with the meats to the table where the customer is waving a green Coaster card, who then picks the type of meat they want and has first-hand interaction with the chefs. This reduces food waste that one would normally see at a traditional restaurant due to an order mix-up or a meal that is not cooked as desired for the customer.

Setup Time Reduction:

The bar area at Brazeiros has implemented many lean ideas in order to reduce the time it takes to set up different cocktail processes. The main drink that is made at the bar is called a Caiparinha. This drink is made with a skinned whole lime, peeled, pitted, and chopped into small pieces. The lime pieces are then put into a glass and muddled with sugar. Rum is added and it is stirred and mixed until all the sugar is dissolved. This cocktail process from start to finish takes almost three minutes. In order to reduce the setup time to make the drink, the bar has implemented steps to have the limes pre-cut so that when it is time to switch from one type of drink being made to the Caiparinha, it can be done much more swiftly. Having the limes pre-cut in a glass with the sugar canister beside them allows the bar to make the drink in under one minute and this allows for fewer workers behind the bar and more efficiently getting all drinks to the customers.

Labor Constraints:

Brazeiros has an ingenious labor constraint policy. Most restaurants pay their cooks an hourly wage and the servers are the only employees who receive tips. At Brazeiros, the cooks are considered part of the serving crew and everyone splits the pooled tips that are received each night. Although Brazeiros pays cooks and servers only the minimum required by state law and also does not give pay raises, the percentage of the tip pool that they receive increases with every 7 months of continuous employment at

the restaurant. This gives cooks and servers an incentive to stay at the restaurant while also allowing Brazeiros to keep their payroll costs at a minimum.

Discussion/Implementations

Brazeiros currently runs an efficient restaurant operation. In this all-you-can-eat Brazilian dining experience, all leftover food is offered to employees after their shifts end. Hence, wasted food is theoretically kept to a minimum throughout the day. However, a recommendation would be to adopt a standard time for all meat and restaurant preparations and to use these standard times for the scheduling of correct number of employees to have on hand on any given night. Time data could be obtained for the average number of walk-in customers per time of year and add these results to the number of current (or scheduled) reservations in order to determine the standard number of servers and chefs needed per given night. This data would also permit cooks to know in advance how much meat to prepare so that there would only be enough fresh, prepared meat for customers that are currently in or about to come into the restaurant.

Brazeiros could also incorporate a lean supply chain system. Currently orders for meats, alcoholic beverages, and other necessities from the food service and spirit distributors are received on a weekly basis. The ordering process is very time-consuming and mistake-prone (due to educated guesses) in the sense that too much of one item might be ordered at the opportunity cost of not ordering enough of another item. If Brazeiros were to implement a computerized food ordering tracking system to track the frequency of orders for different types of meals and drinks, this information could enable the restaurant to adopt a Just-in-Time ordering system with their vendors; that is, to order exactly what they need, in the quantities they need, and when they need it. Additionally, food service deliveries could be conducted before the restaurant opens for business on a pre-determined day rather than during restaurant hours, which can be a disruption for workers and customers alike from the parking lot to the actual provision of food service to paying guests.

Café 4 – Knoxville, Tennessee

Background

Café 4 is an American-style restaurant that features "Southern Comfort Foods with a Twist." The establishment began in 2009 and is located in the Market Square section of historic downtown Knoxville.

The researchers' primary source of contact was the Owner and President, Lori Klonaris (Klonaris, 2014), who aided in discussing her restaurant's current and previous application of lean principles as well as providing a list of other employees to interview.

Café 4 is well known for providing an urban-style dining environment while offering fair-priced, gourmet foods for breakfast, lunch, and dinner. Also at Café 4, customers can enjoy 47 unique beers, a fine glass of wine, or a high quality coffee drink. The combination of these specialties resulted in rapid growth in the early stages of Café 4. These trends are continuing today as Café 4 flourishes in the Knoxville market. As a result of such substantial growth, management and staff were forced to adapt on the run. In order to meet demand, they implemented several lean concepts such as 6s, kaizen, and checklists to name a few.

The researchers enlisted the voluntary assistance of several current Café 4 employees--some from each area of the restaurant - to provide information regarding current processes. Based on these interviews and suggestions (along with on-site observations), the researcher was able to structure a list of recommendations for management to bolster the restaurant's solid performance.

Results

Management

Area Information

Management at Café 4 is required to be knowledgeable in all areas of the restaurant. Therefore, managers have an insight and perspective that is not readily available to location-based employees such as baristas and cooks. Interviews directed at management were more holistically-based and provided an inside look at the broader picture of the restaurant.

One of the primary goals of the interviews was to educate some of the most influential employees on lean concepts. It became readily apparent that, although there was little-to-no knowledge of lean, there were systems in place that replicated basic lean tools. The lean concept of 6s was very prominent. There is a basic order and organization to most areas: Beer is arranged by domestics, imports, and microbrews, bread is stocked on the left and pulled from the right, and there is a general place for everything. Day dots are used to ensure that food is rotated in an effective first-in, first-out (FIFO) method. Café 4 has also carefully placed health code standards and safety posters in strategic areas in the kitchen. In addition to these measures, the restaurant has established a kaizen checklist of sorts that is used by managers to note labor, maintenance, appointment obligations, and observations.

All restaurants must reduce excessive food costs to remain viable. Café 4 is able to have a tight, reciprocal relationship with most of its suppliers so if supplies run low, replenishments are just a phone call away. Lori Klonaris, the Owner and President, ensures that weekly sales are recorded so that sales trends can be monitored. The need for certain supplies can triple depending on the time of year.

According to the interviewees, most waste comes in the kitchen – from food waste to wasted motion. Most of this is unavoidable and simply the nature of the business, but "that is why it's so important to hire the best employees."

Floor Management

Area Information

Similar to the drink station and bakery counter, effective management of the floor (also known as the front of house) is critical to a restaurant's success. In order to gain a sense of Café 4's current state in this area, Chad Cox, one of the company's floor managers and an employee of three years, was interviewed. Chad's current responsibilities include managing the front of house operations as well as performing building maintenance. Supervising the front of house operations ranges from expediting food, handling various employee concerns including schedules and other conflicts, and providing customer service when the need arises. These activities take up the majority of Chad's workday, but he also handles building maintenance which can mean either making the repairs himself or finding the proper resources to correctly repair the issue at hand. In order to make the floor area run as a lean environment, the concepts of 6s, waste elimination, visual management, and preventative maintenance are employed. The issues Chad brought up during his interview are discussed below:

Communication

Café 4's business structure includes owners, managers, and employees who interact together to make the company successful. Due to time and resource constraints, owners are unable to have a meeting with each and every worker when something needs to be communicated. On the one hand, the owner may tell Manager A who is responsible for letting Employee X, Y, and Z know. However, Manager A may forget to share one key piece of information which would aid the employees in doing their job. On the other hand, the employees may have a great idea about improving an area of the restaurant, but the owners are unaware because employees have no way to communicate with them.

Safety

During the interview, several safety issues were discussed, including dangerous stairs linking the basement with the first level, slick floors in the prep kitchen, and the prevalence of derelicts in the historic

Market Square area, where Café 4 is located. As safety is key to the successful use of 6s (safety being the sixth 's'), it is important to eliminate these safety concerns. Due to the layout of Café 4, the stairs cannot be eliminated; however, the need to take them at fast speeds can be eliminated by making standard trips to the basement. Similarly, the kitchen's slick floors cannot be eliminated, but by ensuring all employees have the proper protective gear, the risk can be reduced. Thus, the importance of standard personal protective gear such as non-slip shoes must be clearly communicated to the workers. Undesirables entering the restaurant are yet another situation that cannot be eliminated, but the risk can be reduced. Tip jars can be affixed to the counters to prevent their sudden disappearance. Other surveillance tools such as security cameras could also be installed should it be deemed necessary.

Shortages

Café 4 also runs into the problem of broken plates and missing silverware. While a study could be conducted to pinpoint the exact location where plates become broken or missing, the 6s concept of standardization could be used to create a standard plate location on the bussing carts. This would eliminate precariously stacked plates that are likely to fall off the cart and break when the cart is moved. If the broken plates continue to be a problem, another type of plate could be considered with a lower likelihood of breakage. Regarding the silverware, it is possible that silverware is inadvertently discarded as tables are bused. To mitigate this form of waste, a magnetic trash bin lid could be used to help separate the silverware from the waste.

Often, different areas experience stock-outs of essential items during the shift. For example, the drink station may run out of a particular type of drink or cooks may need to go to the basement to retrieve a certain ingredient. Hence, many different trips are taken to the basement for small items.

Drink Station and Bakery Counter

Area Information

When dining at a restaurant, the first item a customer receives is normally their drink order. Because customers normally request refills on their drinks, it can easily become very time consuming for baristas to manage this. At Café 4, the baristas are in charge of both the drink station and the selling of baked goods from the bakery. If these two tasks are not well managed, this area can become a bottleneck for serving customers. To keep the drink station and bakery counter running smoothly, lean principles such as 6s, process improvement, and waste elimination are key. Currently, lean principles are not something baristas are aware of or use in daily practice. Existing problems and lean recommendations for the drink station and bakery are discussed below:

Stocking

At the end of each shift, baristas must replenish their inventory, such as drinks and baked goods that are running low, for the next shift. If they do not plan ahead, restocking can take many trips to the basement and be a very inefficient use of time. In addition, items that are running low can be forgotten and not restocked. It can be hard to remember inventory that has depleted throughout the shift. To remedy this situation, the 6s principle of standardization can be implemented. By using a dry erase board to document items that run low throughout the shift, restocking time can be significantly reduced. Baristas will be able to read the list they made to determine exactly what is needed. Thus, no items will be forgotten.

In addition to restocking items at the end of shift, baristas must write items that are out of stock on a board in the basement. While the board is a form of visual management that reminds baristas to write down what needs to be ordered, sometimes items can take nearly two weeks to arrive. If an item is ordered when only 1-2 days' worth of the item is left, Café 4 could be out of stock of the item for nearly two weeks. A Kanban system can be used to solve this problem, whereby cards can be placed on items so that when the stock gets to the level that is equal to the lead time for the product to arrive, baristas will know the item needs to be immediately ordered. This will eliminate essential items being out-of-stock due to late ordering.

Excess Baked Goods

Because the bakery is separated from where the baked goods are actually sold, they are not informed of which products they make that actually sell. This presents a problem for baristas. Many times low turnover baked goods take up storage space at the counter. This means that high turnover baked goods cannot be kept in larger quantities at the counter. Hence, when baristas run out of the high turnover baked goods, potential sales are lost. Also, sometimes items made in the bakery are not displayed in the cash register making it difficult for baristas to know how much to charge for the item sold.

High Traffic Times

During brunch hours, baristas are extremely busy brewing coffee due to the increased amount of customers dining at Café 4. Although there are four coffee pots that brew different styles of coffee, the baristas cannot brew it fast enough to meet customer demand. This process can be improved by increasing the number of coffee pots used during these peak hours. This will ensure that enough coffee is made to meet customer demand.

For dinner shifts, drink station employees must repetitively retrieve beer and wine from refrigerators behind them. Although the beer is organized and easy to find, some of the most popular beers should be stocked in the nearest refrigerator rather than the distant one. Although the difference is only a couple of steps, it could potentially save nearly a quarter mile of walking on a busy Saturday night (2.5 feet per step, 4 steps per trip, 100 trips on a given night)!

Kitchen

Area Information

The kitchen is arguably the heart of any restaurant. In a broad sense the kitchen is the biggest potential bottleneck for any restaurant. If the prep and cooking processes in the kitchen are not running smoothly, then this negatively impacts all other parts of the restaurant. The kitchen staff at Café 4 had never heard of the lean philosophy when interviewed but, upon further investigation, it was clear that they unknowingly used many lean concepts on a daily basis.

Jit and Quality

On every shift the kitchen operates a pull-style production system with the primary focus on safety and Just-In-Time delivery. A customer's meal is not prepared until the order reaches the kitchen. When the order arrives, the kitchen staff works together to create and plate the order in a timely fashion. This process goes hand-in-hand with their strict quality control. All food must be properly cooked and plated before it reaches the customer's table. The kitchen staff uses standardized cooking processes in order to ensure that the variation between dishes is kept to a minimum and the quality is consistent. These standardized processes also provide a guideline for how quickly each specific dish should be prepared. If they are consistently slower than the set standard, this alerts the staff that something is wrong.

6S and Cross-Training

Café 4's kitchen staff is highly cross-trained. Nearly every member of the staff is able to do all the necessary jobs that the kitchen station requires. This leads to the high level of flexibility needed to handle a large amount of varying orders. The staff motto is "clean things run better." The kitchen has its own version of the 6s lean concept. Each station is kept organized, clean, and safe throughout the entire shift. Keeping all of the work stations well organized helps to reduce non-value-added time spent looking for necessary tools. The cleanliness of all prep and cook stations directly affect the quality of food. The staff is taught to properly handle knives, hot items, and other potentially dangerous products in order to reduce the risk of injury. Each staff member is also instructed to wear OSHA-approved non-slip footwear.

Production

Currently, the kitchen is more of a hybrid production system that resides somewhere between lean and traditional production. The most central concept in lean is the elimination of waste. All lean tools are

derived from or lead to this basic maxim. The kitchen staff at Café 4 does not seem concerned with the ideas of eliminating waste or reducing cost. Of course, in some areas, they do focus on waste reduction as a way to reduce production time: reducing wasted time in the prep and cooking processes, reducing time spent reading and understanding orders, and reducing time spent traveling from kitchen to storage. However, the staff does not seem concerned about material waste (overuse of ingredients) or material price. It is common for the staff to make too much food that will eventually be thrown away in a traditional restaurant or consumed by employees at Café 4 at the end of the day. The kitchen staff is also supposed to help monitor raw materials inventory levels and report ordering needs, but this process is not well organized. The reordering process is often neglected and the staff ends up with a shortage of ingredients. The current resolution for this problem is to send someone out during the shift to purchase the necessary materials. Most often, the retail material price is much higher than it would have been if they had planned ahead and restocked from their supplier.

The staff would also benefit from standardizing their pre-shift preparation procedures. Each staff member has their own way of prepping for the shift, which often leads to confusion and lack of necessary supplies mid-shift.

Discussion/ Implementations

The researcher interviewed many key employees at Café 4 to determine what they considered to be the most inefficient procedures in their daily routines. The researcher then discussed with Café 4 employees several lean concepts. Once assured that these individuals understood the benefits of using lean principles to reduce waste, several recommendations were discussed with upper management.

In order to improve the channels of communication, a Visual Management Board could be implemented. Similar to Visual Management Boards that are often present throughout manufacturing facilities, the board would include areas that are key to Café 4's success such as safety, quality, inventory, waste, and profits. When an important message should be presented to all employees, it would simply be indicated on the visual management board. Regularly scheduled meetings between the owners and managers and then the managers and their employees would also take place involving this board – perhaps each day or once a week. During these meetings, the group would go over the entire board starting in the first column and moving to the last. This would allow each worker to learn about the things affecting Café 4 while also providing a vehicle to voice their improvement ideas.

Maintaining the building currently means putting in a lot of extra time to locate the right resources or to actually make the repairs. While these maintenance concerns cannot be completely eliminated, they can be reduced by performing preventive maintenance practices and 6s standardization techniques. In order to standardize the process, a maintenance action plan could be created which states what preventive activities are required to take place at a designated time using specified resources. This could include maintaining high kitchen equipment maintainability and availability or something as simple as ensuring all hinges are properly oiled on a periodic basis. Café 4 could also store regularly needed maintenance materials in the building to eliminate the lead time in searching for and obtaining these materials.

In addition to the maintenance planning, a maintenance history database could be created to store the information of previously used resources (name, services provided, location, etc.). This would provide a standard location and format for all resource information, thereby preventing the likelihood of "reinventing the wheel." A comment field could also be created to store feedback regarding previous maintenance work performed at Café 4. Using the maintenance database would also allow the company to build stronger relationships with their parts and equipment suppliers by ensuring their continued patronage.

Retrieving items from the basement is not a value-added process and takes workers away from their regular tasks. For improvement, fewer trips should be taken to the basement and one way to achieve this is for workers to ask other areas if they need anything before retrieving their items from the basement. Also, having one person making periodic trips to the basement to retrieve what is needed will help to keep items stocked on the top floor. Reducing the number of trips to the basement will also reduce time spent on a non-value-added activity.

The bakery should be streamlined to make products that sell well, or have high turnover. Because the cash register keeps a tally of sold items, providing this information to the bakery will help them to see which items are being sold so that they can plan their production accordingly. In addition, a list of items that are stored in the cash register would prove beneficial for the bakery to know which items are currently being offered by Café 4 as well as which items are either low turnover (small batch) or discontinued items. This will help reduce the waste of unsold products.

In addition, baristas are in charge of disposal of stale baked goods at the counter. However, this is not an easy task because Café 4 does not currently post a date on their baked goods. Hence, this leads to the sale of potentially stale items to customers. If a customer were to purchase a stale item, low customer satisfaction and a loss of a customer could result. Date dots can be placed on each baked good which lets the barista know the expiration date, thereby making it much easier to identify which items to discard each day.

CONCLUSIONS AND RECOMMENDATIONS

In the restaurant industry, customer satisfaction is the key to survival and prosperity. In order to maintain high levels of satisfaction, it is crucial to fill orders as quickly and efficiently as possible. The three dining establishments in this case study revealed many current Lean applications in the restaurant industry.

At Cherokee Country Club, standardized table setting procedures in a detailed training manual complete with pictograms would enable temporary workers and new hires to quickly learn how to correctly set up the banquet tables without the burden and expense of having an experienced worker teaching them. A simulation model could be explored to assist in modeling staffing needs based on key parameters from past events.

At Brazieros, if standard times were adopted for tasks around the restaurant, the company would be able to more effectively schedule the correct number of workers for each day in order to prep the restaurant for that night's customers.

Unlike most businesses where labor costs drive down profits, Brazieros' highest expense is the cost of food. Wasted food (meat, in particular) cuts heavily into the restaurant's bottom line. With lamb chops reaching almost $500 a box, an efficient way to prepare the right amount of meat would be of the immense benefit to the company. Brazeiros could implement an inventory tracking device into their current operating system that would better enable them to control inventory. It would also make their supply chain more efficient through instantaneous product ordering of low inventory items. Another recommendation is to use a local meat supplier to reduce transportation costs and it would also allow Brazieros to market their business to the growing number of consumers who are interested in consuming organic, locally grown meats and produce.

There is always room for improvement when implementing the lean philosophy. The kitchen at Café 4 has done an impressive job of designing a smooth JIT production system, but they are certainly no exception to the rule of continuous improvement. It is recommended that they focus on material waste reduction, quality, and speed.

Although there are many processes in place that "streamline the organization," there still exists an abundance of opportunities such as a focus on storage. While a few steps have already been taken to make the storage (or stock) room more organized, the implementation of a visual management system within the storage rooms, with a series of green, yellow, and red cards, for example, would be very beneficial to immediately let managers know what supplies are stocked, low, and out. In addition, a labeling system that can be easily altered with food product changes would be beneficial since preparing for the arrival of a new product or the demise of poor performer would be as simple writing on a whiteboard.

These recommended changes would allow Cherokee Country Club, Brazieros, and Café 4 to reduce their waste costs such as time and food, increase employee utilization while lowering labor costs, operate at a more efficient inventory level, and improve their profitability.

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