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Assessment of Retail Practices for Providing Enhanced Value Added Services and Improved Customer Satisfaction Using Lean Manufacturing Approach

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ABSTRACT

The purpose of this study is to apply lean manufacturing principles in retailing services for enabling retail managers to understand takt time and value added services (VASs) in order to achieve benchmarked retail efficiency. In-depth literature review on lean manufacturing research has been gauged and three potential retailers practicing VASs have been identified for conducting the present case study. *In situ*, primary data have been captured and processed for necessary calculation. The notion of takt time has been introduced in retailing and a new concept of relative efficiency has also been developed to accomplish increased efficiency with more VASs. In order to provide more VASs, retail managers have to be lean thinking oriented. The results obtained in the three retailers are good enough to implement lean tools and enhance day to day efficiency at the outlets. Therefore; various improvement proposals have been identified along with managerial implications.

Keywords: Lean Manufacturing, Lean Principles, Relative Efficiency, Retail Stores, Takt Time, Value Added Services
JEL Classifications: L81, M11

1. INTRODUCTION

The quest for process and business transformation began using lean principles in early 1970. Since then new avenues are being explored and accessed to enable manufacturers and entrepreneurs to rethink their business model in a way that offers value addition and most competitive price to customers. Modern business organizations are looking for new strategies that will keep them in a market for a long time. In fact, many business organizations are relying on a business model that enables them to sell their product and services at most affordable and competitive prices. Globalization has boosted fierce competition by allowing more people to share the global market place; whereas the digital technology has tuned automation in a way that there is hardly any difference in a manufacturing process. Most organizations are trying to be different with their competitors in product or service deliveries. They also consider value addition in each area of manufacturing or services, where they can apply lean principles in order to reduce waste and gain cutting-edge in the market.

Lean has been practiced for process improvement by keeping eye on muda (waste). Therefore; by adopting lean principles in each and every process, one can get several benefits such as reduction in cycle time, quality enhancement, rapid product and service deliveries, improvement in labor productivity, reduction in transportation cost etc. With an advent of a well-accepted concept of "everything under one roof," the rush to the retail shop has been increased tremendously. Entrepreneurs find more difficult in managing customer services. It has been seen that because of more hectic work schedule and limited time slots availability, there is a tendency to shop more at one instance under a single roof.

Entrepreneurs find more difficult to manage their service centers in managing the long waiting time at the exit. Customers are finding a hard time to get their turn for a smooth exit with purchased goods. In many instances there is no time for stock taking for inventory management which resulted in many items disappearing from the shelves and customers find themselves fumbling. Customers are also seen balking away during rush hours or cheaper offer days and thus entrepreneurs loose profit opportunity in a big way. Hence; in order to lure customers with value added services (VASs) and to outplay strong competition, an entrepreneur must come out with a lean thinking in day to day retail practices. The entrepreneur should become agile and must be able to sense the customers' nerve in order to sense their needs and desires so to react in a minimum time with the best possible business practices.

Successful application of lean principles and practices can make fundamental changes in business model to improve the efficiency and quality of retailing services. Retailers on these days face more dynamic competitors than before due to current global reach and acquisitions (Burt et al., 2002). The retailing business is on boom today because of many multinational companies that targeting and looking for the extra – mileage from the retails sector. The retailing business has also been the focus of both academics and practitioners owing to the international competitions between some companies such as Walmart and Tesco (Alexander, 1990; Uusitalo and Röckman, 2004). Berne' (2006) shows that customers changed their consuming demand and habits due to some social and demographic changes such as immigration, smaller households and increasing aging in populations. Therefore, food retailors must look for resources and ways to be competitive (Davis et al., 2008; Gonza´lez-Benito, 2002). They should understand how customers perceive them to come up with the suitable combinations of elements that will generate an interaction of multiple elements in a store to produce an effect different from or greater than the sum of their individual effects (Betancourt et al., 2007). Several studies identified the key characteristics and the relationships between them that will enable retailers to differentiate themselves from others. Most of these studies dealt with the customer's perceptions of various attributes like variety, quality, customer attention, price, etc. Managers at retails must know how best they can satisfy customers with their purchases. Many studies dealing with attributes ranking for enhanced purchase are available in the body of literature, unfortunately; none of the study deal with the concept of lean thinking for VASs by curtailing excessive billing time for a smooth exit. Customer satisfaction is largely influenced by their buying experience and especially unnecessary waiting time. Therefore, this study is intended to study the existing efficiency of retails and explore how best the efficiency can be enhanced using takt time concept in order to cut excessive waiting time of customers.

Based on the above premises, the aim of the present research is to revisit the lean principles and shed light on its possible implementation in retailing services at retail stores for the purpose of benchmarking and assessing its impact on waiting time and the customers' satisfaction, focusing on the need for improving the efficiency and effectiveness of retailing service delivery and consequently increasing customer satisfaction.

Hence; the present research aims for the following multi-objectives:

1. Measure the waiting time of customers checking out from a retail store
2. Devise methodology in order to benchmark retail operations to facilitate in computing and comparing retailing efficiency.

The characteristic features of retail stores have been identified and reviewed in Section 2. In Section 3, few important terms of lean manufacturing and their comparisons have been dealt with to provide a clear understanding of the present research. In Section 4, *in situ* data collected from the three identified Store A, Store B and Store C located in a major city in the southern part of Saudi Arabia are presented in terms of customers' waiting times at the exit lane in the checkout points. The collected sample data has been analyzed for meaningful conclusions, the same are presented in terms of proposed manufacturing metric in Section 5. Section 6 presents the results and conclusions wherein the using lean manufacturing approaches the store efficiency has been compared and discussed for future improvements. Section 6 discuss the managerial implications based on the present study, the paper is concluded with future research.

2. LITERATURE REVIEW

Lean thinking is a term coined by Womack (Womack et al., 1990; and Womack and Jones, 1996) to describe a process management philosophy approach for improvement originated in the manufacturing sector by Taiichi Ohno at Toyota Motor Corporation. It has drawn a widespread attention due to the extensive effort of Womack et al. (1990) and Womack and Jones (1996). Lean is defined as a continuous improvement methodology focusing on eliminating the non-added value activities (waste) in order to reduce the cycle time, improve quality, enhance the flow of customers, products or information and to increase labor productivity (Krajewski and Ritzman, 2002). In addition to that, lean is focusing on waste elimination, problem-solving, partnership, process improvement and increasing value to customers (Liker, 2004) through the application of the five lean principles. The five main principles of lean are value identification from the perspective of end-customers; value stream mapping and identification for each product or service and waste elimination, creation of product continuous flow, the use of pull mechanism, and pursue perfection. In conclusion, an organization looking to be successful in lean implementation necessitates changes in behavior, mindsets, culture and creates an effective communication process that can be considered as the core step in the lean implementation process (Liker, 2004; Shah and Ward, 2003; Spear and Bowen, 1999; Hines et al., 2008).

Traditionally, lean thinking has been successfully applied in manufacturing systems and production activities for the purpose of reducing lead time, eliminating waste and non-added value activities as well as improving quality. In addition to that, studies have proved that lean concepts and principles could be applied to healthcare enterprises, services facilities and retailing delivery (Womack and Jones, 1996). In recent years, several managers and researchers have extended the application of the principle and basic tools of lean thinking into many service facility sectors. Lean thinking has reduced waste and improved efficiency in different service industries such as human resources (Laureani and Antony, 2011), health care (Castle and Harvey, 2009), customer relations (Womack and Jones, 2005), information technology (Hicks, 2007), logistics (AlRifai, 2008), sales (Kosuge et al., 2009), office service and administrative processes (Hyer and Wemmerlov 2002), call service centre (Piercy and Rich, 2009), and public services (Pedersen and Huniche, 2011). In spite of lean practices covering a large spectrum of product and service industries, retail service has not been fully explored. Limited literature on lean thinking in retailing services environment found in the body of literature.

Customer satisfaction has been a deciding factor for the success of any business model. Few studies are found that have explored the various attributes of retails stores that drive the customer satisfaction. If these attributes are sincerely studied and adopted in retails store, successful business strategies may be evolved. These attributes can also create a vision of how the groceries customers can differentiate value and how these attributes influence the degree of the customers' satisfaction (Martìnez-Ruiz et al., 2010; Davis et al., 2008; Ganesh et al., 2007; Berne´, 2006). The excessive amount of waiting time in a long queue may influence the customer satisfaction, but studies exploring the time spent during checkout lanes are scarce in the body of literature.

Various attributes that are largely found in the literature to influence customers' satisfaction are briefly discussed as follows:

2.1. Variety

A large variety of the offered products by retail distributers (Levy and Weitz, 1995) plays an important retail strategy which serves large group of customers that have different tastes and preferences. This feature will help retailers draw more customers and encourage the customers to spend more by increasing the purchase volume and its frequency.

2.2. Quality

The retailers can differentiate themselves by providing high-quality merchandise (Binninger, 2007; Pan and Zinkhan, 2006) due to the fact that quality of the product sold is considered as one of the major values that customers can evaluate the establishment (Levy et al., 2005).

2.3. Customer Attention

Shopping is considered by some as a social activity which overcomes the loneliness of some customers who are facing this disorder. These groups of customers consider shopping as a social activity and hence the retailers should pay more attention and deals with them as if they are part of the store family (Rubenstein and Shaver, 1980).

2.4. Additional Services

Apart from the regular services, customers will be delighted if they are given an additional service. Additional services like operating hours, location and the availability of free samples are considered as factors work positively toward attracting more customers (Gonza´lez-Benito, 2005).

2.5. Store Location

The location of the retail establishment plays a major role in the customers' perception of such establishment due to the time and effort required by the customers to complete their purchase (Berry et al., 2002), hence the managers should locate their facility in such way that it will minimize the customers' effort in their purchasing adventure.

2.6. Store Atmosphere

Store atmosphere may also lure more customers. Some of the studies indicated that customers are highly influenced by their attitude toward the atmosphere of the establishment such as sight, smell and sound (Bigne´ and Andreu, 2004).

2.7. Pricing and Discount

There is no clear cut opinion on the market position regarding the consumer's perceptions on the price. For example, Lichtenstein et al. (1993) emphasized that higher prices are a positive value since it indicates a high quality and prestige to the customers, while Dodds (1995) suggested that high price is perceived by customers as an economic sacrifices. Regardless of how consumers perceive the price issue, it is an issue affects the customer's decision on his or her purchases.

3. UNDERSTANDING CYCLE TIME AND TAKT TIME

In a production system, cycle time; is the exact time required to produce a part or a sub-assembly or complete product, whereas takt time is determined based on the number of finished product that must come off the production line each day to meet the production target or customer demand. In the present study, takt time is selected as a quantitative tool to measure the efficiency of the retail stores. It is calculated by dividing the available operational time for its production with the required production volume per period:

$$\text{Takt time} = \frac{\text{Operational time per period}}{\text{Required production volume per period}} \quad (1)$$

Where,

$$\text{Operational time} = \text{Production time} - \text{Breaks} \quad (2)$$

Required production = Production volume.

$$= \frac{\text{Annual production}}{\text{Working periods per period}} \quad (3)$$

Takt time can be used for all units in the value stream to adjust production quantities to actual demand in order to manufacture items only when needed.

3.1. Cycle Time and Takt Time Comparison

Cycle time is how long it should take to produce a part or sub-assembly or a product. It includes value added and non-value added activities. Cycle time depends on many parameters like number of operations; number of service stations, availability of raw materials, manpower, etc. The takt time depends upon the changing demand of the customers. Since the mood of the customer is ever-changing. Retail managers are often found in a dilemma to gauge the customers' taste and preference. The number of customers visiting during a particular time slot or a day of the week has been bothering factor as they always find the mismatch between a number of customers and number of service stations for their smooth exit. The mismatch between cycle time and takt time also pose lot of challenges to the retail managers. When cycle time and takt time mismatch either an underutilization or bottleneck in the system is surfaced out. The ideal situation is only prevailes, when cycle time equals the takt time. Various scenarios that can be found with their leading effects are listed:

- When cycle time = takt time; the production line/service line is smooth and considered to be flawless and efficient
- When cycle time > takt time: The production capacity/service capacity is underutilized leading to waste and inefficiencies.
- When cycle time < takt time; the presence of bottleneck in the production line/service line cannot be ruled out.

4. DATA COLLECTION

In order to collect the actual data representing the actual time that makes customers to wait in the exit lane to pay for their purchased items, teams were deployed at each retail store to collect the required data.

Figure 1 shows the schematic of various operational activities of a store and waiting of customers in a queue for their turn at the exit counter. The waiting time has been measured from the moment customer join the queue and till he/she get bags filled by Bagger, Sacker or Bag boy (A courtesy clerk at a retail, upon request he arranges another kind of services like carrying shopping trolley up to customer's vehicle). Most of the retails operate on multi-servers, multiline, single phase system in order to provide quick service to their worthy customers; the same is depicted in a schematic diagram.

Table 1 represents data collected in a month time from three identified retail stores i.e. Store A, Store B and Store C. The team recorded the waiting time it takes each customer from the moment joins the exit point lane until the same customer pays the bill at the exit point and receives baggage, filled with purchased items.

5. DATA ANALYSIS

Based on the data collection of retails Stores A, B and C, the collected data was tabulated in order. The actual available time/ day was calculated for each store as shown in Table 1.

The cycle time and takt time for Store A, Store B and Store C are calculated. Cycle time is calculated as the proportion between the total actual times it takes the customer waiting in the lane to the total number of customers in a time period. Cycle, takt time and efficiency calculations for identified stores are as follow:

- For the store A:

$$\text{Cycle time} = \frac{487{,}076}{38{,}797} = 12.60\ \text{s / customer}$$

$$\text{Takt time} = \frac{1{,}332{,}000}{38{,}797} = 34.33\ \text{s / customer}$$

$$E_A = \frac{\text{Cycle time}}{\text{Takt time}} = \frac{12.6\ \text{s / customer}}{34.33\ \text{s / customer}} = 0.36$$

- For the store B:

$$\text{Cycle time} = \frac{33{,}901}{39{,}018} = 8.7\ \text{s / customer}$$

$$\text{Takt time} = \frac{1{,}238{,}400}{39{,}018} = 32\ \text{s / customer}$$

$$E_B = \frac{\text{Cycle time}}{\text{Takt time}} = \frac{8.7\ \text{s / customer}}{32\ \text{s / customer}} = 0.27$$

- For the store **C**:

$$\text{Cycle time} = \frac{36{,}636{,}240}{43{,}393} = 14.0\ \text{s / customer}$$

Figure 1: The various operational activities at the store including customer waiting

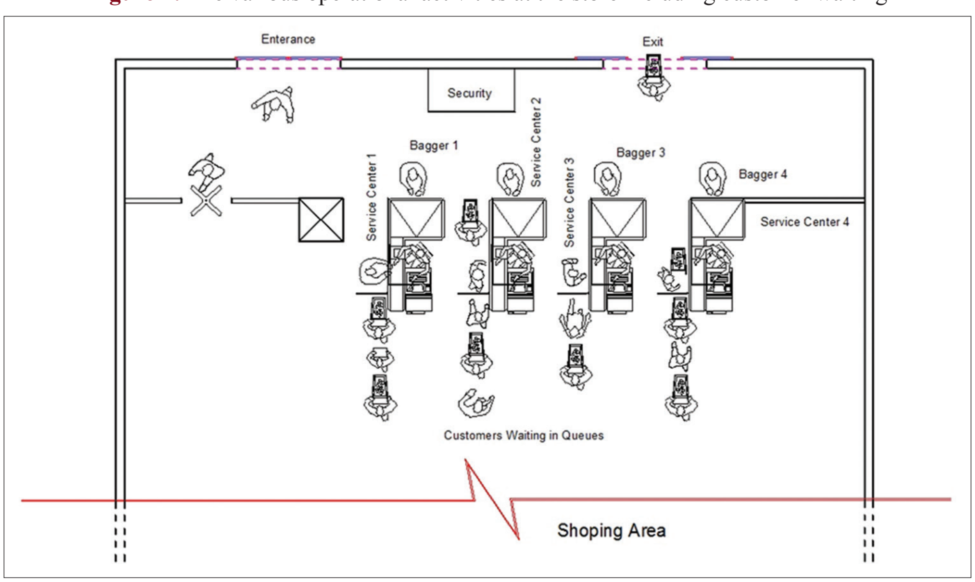


Table 1: Observed time for three retailers i.e., Store A, Store B and Store C

Day	Store A			Store B			Store C		
	Customers	Time in seconds	Available	Customers	Time in seconds	Available	Customers	Time in seconds	Available
Sat	719	5176.8	46,800	1445	7803	43,200	1139	9112	61,200
Sun	948	9859.2	46,800	1847	9235	43,200	1150	8050	61,200
Mon	946	17,974	46,800	840	3360	43,200	1156	13,872	61,200
Tue	950	11,400	46,800	1002	7014	43,200	1201	15,613	61,200
Wed	854	10,675	46,800	1553	13,977	43,200	1205	14,460	61,200
Thu	948	16,116	46,800	711	8532	43,200	1215	20,655	61,200
Fri	1151	9208	28,800	953	9530	28,800	1231	23,389	28,800
Sat	946	7568	46,800	1002	12,024	43,200	1239	26,019	61,200
Sun	925	7770	46,800	2053	26,689	43,200	1242	31,050	61,200
Mon	1007	8861.6	46,800	1030	10,300	43,200	1248	14,976	61,200
Tue	1656	15,898	46,800	1300	7800	43,200	1252	21,284	61,200
Wed	1656	19,872	46,800	1530	13,464	43,200	1315	6575	61,200
Thu	1657	28,169	46,800	2156	8193	43,200	1326	9282	61,200
Fri	1149	18,384	28,800	1505	10,234	28,800	1348	7953.2	28,800
Sat	1148	13,776	46,800	2254	20,286	43,200	1352	10,816	61,200
Sun	1150	11,500	46,800	758	7428	43,200	1432	14,177	61,200
Mon	1152	13,824	46,800	848	10,176	43,200	1449	17,388	61,200
Tue	1153	6918	46,800	1842	22,104	43,200	1455	24,735	61,200
Wed	1212	8484	46,800	1512	19,354	43,200	1459	17,508	61,200
Thu	1511	13,448	46,800	1707	11,949	43,200	1503	22,545	61,200
Fri	1510	14,949	28,800	1730	15,570	28,800	1635	25,833	28,800
Sat	1512	15,120	46,800	326	1304	43,200	1715	23,667	61,200
Sun	1512	19,656	46,800	524	2987	43,200	1725	33,465	61,200
Mon	1510	28,690	46,800	800	5416	43,200	1729	39,767	61,200
Tue	1514	31,794	46,800	1346	8076	43,200	1733	36,393	61,200
Wed	1659	26,544	46,800	1107	9852	43,200	1739	59,126	61,200
Thu	1513	21,182	46,800*	2303	29,939	43,200	1744	17,440	61,200
Fri	1659	27,042	28,800#	705	8460	28,800	1807	14,456	28,800
Sat	2349	31,712	46,800	828	7452	43,200	1814	16,326	61,200
Sun	1221	15,507	46,800	1501	10,507	43,200	1834	14,672	61,200
Total	38,797	487,076	1,332,000	39,018	339,014.9	1,238,400	43,392	610,604	1,706,400

*Available time (Monday to Thursday)=8*60*60=28,800 s, #Available time (Friday, half day working)=8*60*60=28,800 s

$$\text{Takt time} = \frac{1,706,400}{43,393} = 39\ \text{s / customer}$$

$$E_c = \frac{\text{Cycle time}}{\text{Takt time}} = \frac{14.0\ \text{s / customer}}{39\ \text{s / customer}} = 0.36$$

The various results obtained for Store A, Store B and Store C are tabulated in Table 2.

The results obtained thus are also graphically represented for easy understanding in Figure 2.

A concept of relative efficiency $RE_{X/Y}$ is used to compare the efficiencies between the two stores X and Y as follows:

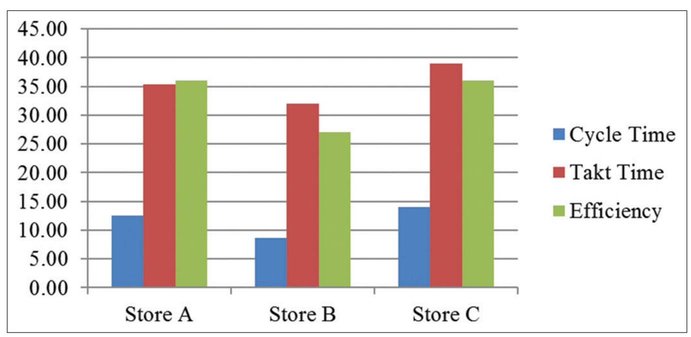
$$RE_{X/Y} = \frac{E_X}{E_Y}$$

For example,the relative efficiency between Store A and B, $RE_{A/B}$:

$$RE_{A/B} = \frac{E_A}{E_B} = \frac{22}{16} = 1.4$$

This figure implies that Store B is 1.4 times more efficient than the Store A. Likewise all the relative efficiency between Store A, Store B and Store C has been calculated and tabulated in Table 3.

Figure 2: Comparing cycle time, takt time and efficiency of Stores A, B and C



6. RESULTS

Cycle time deals with the time needed to complete the operations whereas the takt time deals with the time needed to complete the operations with respect to customers' demand and the available time. In the present study cycle time and takt time of three Store A, Store B and Store C have been calculated and compared for meaningful inferences as follows:

- In case of store A,

  The cycle time < takt time (i.e. 12.6 < 34.33), cycle time is 12.6 s, whereas takt time is 34.33. In this case, the store

Table 2: Cycle time, takt time and efficiency of stores A, B and C

Description	Store A	Store B	Store C
Cycle time	$\frac{487,076}{38,797}$ = 12.6 s/customer	$\frac{33,901}{39,018}$ = 8.7 s/customer	$\frac{36,636,240}{43,393}$ = 14.0 s/customer
Takt time	$\frac{1,332,000}{38,797}$ = 34.33 s/customer	$\frac{1,238,400}{39,018}$ = 32.00 s/customer	$\frac{1,706,400}{43,393}$ = 39.00 s/customer
Efficiency	$\frac{12.6\ \text{s / customer}}{34.33\ \text{s / customer}}$ = 0.36	$\frac{8.7\ \text{s / customer}}{32\ \text{s / customer}}$ = 0.27	$\frac{14.0\ \text{s / customer}}{39\ \text{s / customer}}$ = 0.36

Table 3: The relative efficiency between stores

	Store A	Store B	Store C
Store A	-	-	-
Store B	1.4	-	-
Store C	1	0.72	-

A's inefficiency in managing customers has been surfaced out. Store A has been underutilizing the capacity to serve the customers in more efficient ways. According to lean manufacturing principles, more waste exists in the operation of Store A. The efficiency of Store A (E_A) is calculated as ratio of cycle time to takt time and found to be E_A= 0.36. The efficiency obtained may also be compared with ideal case. It is also evident from the calculation that the length of waiting time of the costumer is 36% of being ideal, which means; under the current situation each customer spent on an average of about 0.36 of what customer is supposed to take time.

- In case of store B,
  The cycle time < takt time (i.e. 8.7 < 32.00), cycle time is 8.7 s, whereas takt time is 32.00. In this case, the Store B's is also having problems in managing the customers. Store B has been underutilizing the capacity to serve the customers in more efficient ways. The efficiency of Store B (E_B) has been found as E_B = 0.27. From the result, it can be said that the length of waiting time of the costumer is 27% of being ideal, which means; under the current situation each customer spent on an average of about 0.27 of what customer is supposed to take time.
- In case of Store C,
  The cycle time < takt time (i.e. 14.00 < 39.00), cycle time is 14.00 s, whereas takt time is 39.00. In this case, the Store C's is also having problems in managing the customer line, store A and Store B. Store C has been underutilizing the capacity to serve the customers in more efficient ways. The efficiency of Store C (E_C) has been found as E_C = 0.36. From the result, it can be said that the length of waiting time of the costumer is 36% of being ideal, which means; under the current situation each customer spent on an average of about 0.36 of what customer is supposed to take time.

7. CONCLUSION

The present study will be an eye opener for retailers that ignore their customers and compel them to wait for their turn in long queues. This research offers a new useful approach to compare the efficiency of checkout points at different retail stores from the waiting time perspective. The inference from the present study also lead to possible danger of balking of customers from the store, when they foresee extended waiting times in long queues at the exit points. It is also evident from the study that the long waiting times in queues also compels to shift their loyalty to another store which happens to be more swift in operation and offering less time at exit point.

Managers at retails have got a lot of managerial implications from the present study. Managers will be able to practice lean manufacturing in their day to day operations and become well informed about their operating efficiency. They will be in a position to understand the cycle time, takt time of their store and its implications on the customers' mood. In the case of moderate to worst cases, immediate action may be warranted. In such cases, managers will be more comfortable in managerial decision making and trying out more options to make the store more efficient and fat free. Retail manager will be in a position to understand the pace at which his staff must perform in order to keep the pace with customers. Retail manager may also be in a position to deploy requisite staff in accordance with the changing demand. This study also motivates retail managers to target those processes which need improvement to reduce process time. Reducing a process time and thus meeting a takt time will help retail managers for opting for the same staffing level without indulging into increased level of hiring and firing.

The present study may be extended in comparing the operating efficiency of banks wherein waiting time is seen as more punishing and balking is more evident and crucial. A decision support system may be evaluated to help managers in decision making in different scenarios with increased or decreased strength of customers. Using Laser-aided digital camera, the customers rushing into the entrance of may be gauged and system updates to calculate the change in takt time and available time. The manager may get help from the system about possible increase or decrease of time in offering service. In such cases, manager will be more comfortable in managerial decision making.

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