

## C Suite core strategic alignment with Supply Chain: Zeroing in on waiting times for customer's sole brand

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### Abstract

As the wave of MSME as well as large scale manufacturing efforts have picked up, the analysis of customer focused key parameters has been zeroing on micro elements. The evolution is due to technology backed operations. Technology has been integrating manual coordinating actions at never before pace.

**Key Words:** Supply chain, Industrial, Time, Executive, CEO, Operation

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### I. Introduction

Since 1765 to beginning of 19<sup>th</sup> century, we saw the development of steam engine, running with the help of coal & water, it was the First industrial revolution. The second one changed the scene with the evolution of Electricity with Gas, Coal & Oil, in the last few years of 19<sup>th</sup> ( 1870 onwards ) and beginning of 20<sup>th</sup> century. The Third Industrial revolution was sparked after 1950 when the Electronics, Telecommunication and age of Computers later started dominating the scene till start of 21<sup>st</sup> century. The fourth industrial revolution is taking the Supply Chain with manufacturing at the next high at national level. Correctly to mention, we are into boundary less geography worldwide since the last decade and further time to come.

The fourth industrial revolution has been a 'digital revolution' which is highlighted in soaring economy, driven by portable internet, Automation and Artificial Intelligence (AI). In this study, a few of MSME manufacturing setups are seen to be successfully picking up the technology wave. Many of the medium and small are struggling to jump on to the speed to stay in competition and survive. Winning is the distant goal for them.

When most of the functions are getting 'digitalized', the SCM function has gradually occupied place at CEO, CFO, CXO/ COO forte. Their efforts are more concentrated in reorienting the SCM strings. Market horizons are expanding, demanding their involvement in SCM parameters, as directly impact brand image. Response time, zero stock outs, faster cloak speed for wide range of innovations have been dominating the brand position. Waiting time at counter and machine is shrinking indicating that the price tag is not a deterrent. CEOs focus areas have taken a turn for these factors. This study focuses on the change in C-management focus areas and the way the turn is shaping up.

The paper first underlines the shift of control of operations from the Line function Level to Staff / Top Management Level as a strategic paradigm. Secondly it elaborates a case study where how a real time issue has been analyzed with stepwise solutions. It is to highlight the need of Data based simulation solutions for the new Volatile, Uncertain, Complex and Ambiguous (VUCA) issues. This was a study of my group of associates in one of the Chennai based E- commerce pair of outlets some time back. While doing the study, findings regarding the consumer behavior in response to BRAND is also noted.

Theoretical aspect is the DESIGN of the CONTROL of Supply Chain. The arbitrary and personal decision making has to be shifted to DATA Based one, is the central theme, which has landed on at C level desk as responsibility in the new scenario. There is no alternative to AI practices for solutions to VUCA issues, as mentioned above

**Methodology:** Real Time data collection at Retail outlet and Analysis of options

Everything is part of technology... In terms of simulation

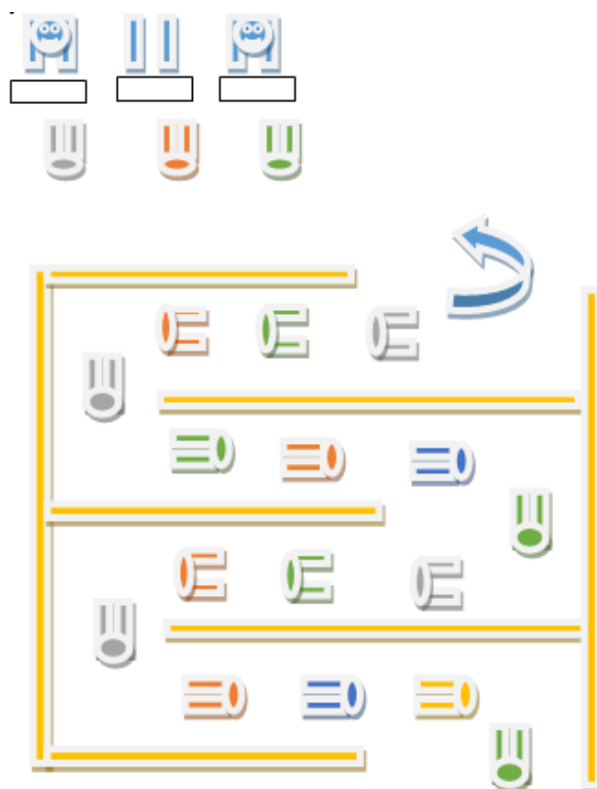
In 2016 at World Economic Forum, this thought was revealed by Klaus Schwab, Founder and the Executive Chairman. Digital technologies, Automation and AI have progressively taken over the industrial world, supply chains, markets with their suppliers. B2B operations with 3rd, 4th level of honeycombing has grown exponentially.

Traditionally finance, marketing and production issues have been at core in minds of C level executives. More space is being occupied by Supply Chain parameters now. A Retailer from South and West has been experiencing long customer queues at the cash counter, resulting in increased duration of customer waiting times, during peak hours at weekends. There was genuine concern that customers would simply walk away without shopping after seeing long queues. This could affect retail revenue and brand image too. It is found over periodic surveys that customers widely take this retail shopping as a major leisure-time activity. Customers do not enjoy the shopping experience due to the time spent on check-out counter queue.

A simulation study was undertaken to correlate the customer waiting time and queue lengths to sort out the issue. The concept of assimilating smart supply chain data (like cyber- physical manufacturing, their supplies, logistics) roll off faster solutions in such Simulation.

**Consumer work study during exit after shopping:**

(Source of diagram: layout of the E-commerce client in Chennai)



The retailer operated the queue with SIX cash counters as shown in the picture above. Wherein, the customers queued in to one single queue. They were directed to the respective queues once the counters were made available.

The situation was that there were customers with less than 10 items as well as more than 10 items in the same queue. So even when the customer has less than 3 items to bill, he has to wait in the queue till all in the front in the queue received the service at the counter.

The waiting line situation started getting worst on weekends, the owner started facing customer frustration. CEO started to look for solution.

He deputed an experienced staff for experimentation and analysis. He suggested to divide the customer movements as,

CPOE...Customer Point of Entry at the Main Entrance

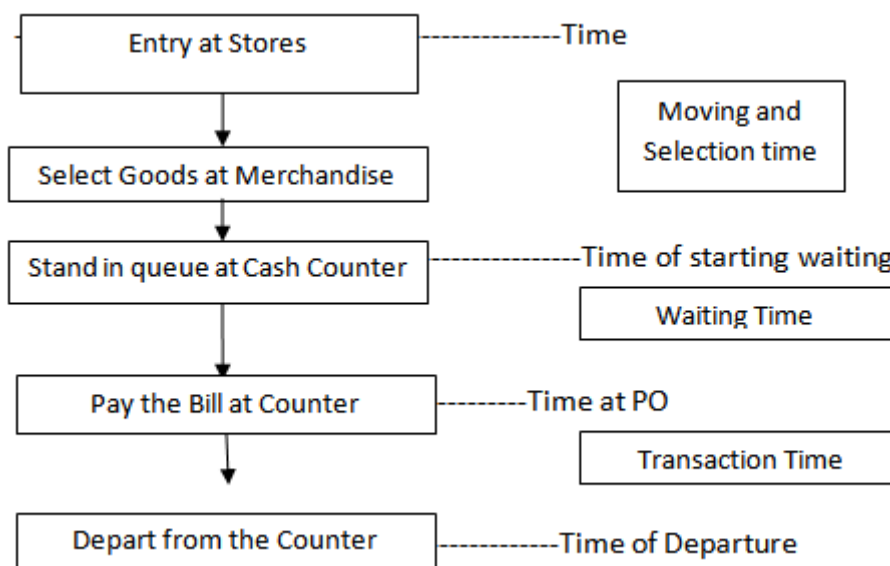
CPOP...Customer Point of Purchase where he selects the product and bags it

CPOS...Customer reaches Cash counter point where he submits the products for billing. Invoice is generated at the counter.

**Consumer work study during shopping:**

(Source of Flow chart: Work Flow for customers of the E-commerce client in Chennai)

The retailer has been operating with SIX cash counters.



To understand the queuing behavior, the senior staff selects 4 different situations for simulation for SIX cash counters on 3 busy days. The scenarios are analyzed as,

1. Customers arrive at the counter on every 0.5 minute. The Average time is taken from the Counter on 3 days.
2. Customer arrival volumes at the counter are based on an hour by hour numbers as recorded by The Manager. The data submitted by the Manager, is indicated in Table 1.
3. He splits the queue for customers with more than 20 products so that TWO counters are assigned to the customers with more than 20 products. Other FOUR counters are assigned to the customers with less than 20 products.
4. He splits the queue based on the customers whether they are paying through CARD or CASH. FOUR counters are assigned for CARD payment customers and the other TWO for the CASH payment customers.
5. The scenario to determine the number of cash counters for the peak customer demand.

**SCENARIO 1- Customers arriving on the average every 0.5 minutes**

The simulation analysis provided the following results. The Analysis shows the maximum waiting times ranging from 1.4 to 3.9 minutes, not a significant Time.

The scenario 1 is not accepted as it does not correlate with REAL situation. The reason is the actual arrival times are not the average arrival times, considered for simulation.

Therefore Scenario 1 is rejected.

It was then decided to use input data that was more representative of the customer arrivals. This is redone for Scenario 2.

Model Type	Maximum waiting time Minutes	Average waiting time Minutes	Maximum Customers in waiting
April 25th-Thursday	3.9	0.2	8
April 26th-Friday	2.2	0.2	5
April 27th- Saturday	1.4	0.1	3

(Scenario 1 data: Consultancy Associate’s study at E – commerce Company in Chennai)

**SCENARIO 2-Customer arrival volume I based on hour and hour basis**

The raw data of customer arrivals, was the key input to the simulation model as shown below,

Customers serviced on Time	April 25th	April 26th	April 27th
12 AM	5	9	0
9 AM	5	2	4
10 AM	53	53	62
11 AM	82	74	75
12 AM	99	85	98
1 PM	74	105	108
2 PM	82	92	130
3 PM	71	123	107
4 PM	87	112	113
5 PM	86	154	114
6 PM	105	144	149
7 PM	108	161	103
8 PM	135	149	132
9 PM	137	140	100
10 PM	125	131	69
11 PM	62	105	26

(Scenario 2 data: Consultancy Associate’s study at E –commerce Company in Chennai)

The simulation analysis, provides the results as,

Model Type	Maximum waiting time Minutes	Average waiting time Minutes	Maximum Customers in waiting
April 25th- Thursday	8.1	1.6	18
April 26th-Friday	45	14.9	93
April 27th- Saturday	11.5	1.8	24

(Scenario 2a data: Consultancy Associate’s study at E–commerce Company in Chennai)

As it can be observed that the analysis, Friday was the bad day when the maximum waiting time was 45 minutes with maximum 93 waiting customers in the queue.

This was the real problem the Retailer was worried about.

**SCENARIO 3- Split the queue for the customers with more than 20 products and customers with less than 20 products.**

To find the real solution to his problem, this was one of his ideas. It was tested for find results.

The analysis shows the following results,

Model Type	Maximum waiting time Minutes		Average waiting time Minutes		Minimum Customers in waiting	
	Less than 20	More than 20	Less than 20	More than 20	Less than 20	More than 20
April 25th - Thursday	41.5	19.2	9.1	0.9	69	3
April 26th-Friday	97.4	15.7	34.4	3	162	6
April 27th- Saturday	74.7	6.7	31.9	0.7	124	2

(Scenario 3 data: Consultancy Associate’s study at E–commerce Company in Chennai)

It is obvious with these results that the problem is not resolved. The waiting times as well as the number of waiting customers are still high.

This idea of splitting the queue based on number of products also was rejected.

**SCENARIO 4- Split the queue for the customers on whether the customers would pay in Cash or Card.**

The simulation showed the following results in terms of waiting times and number of customers waiting.

	Maximum Waiting Time in Minutes	Average waiting Time in Minutes	Maximum Number of Customers	
April 25th	15.9	3.7	19	Others -770
April 25th	10.4	1.8	10	Cash-566

April 26th	98.3	34.6	133	Others-1057
April 26th	7.4	1.2	12	Cash- 582
April 27th	26.9	7.2	29	Others -845
April 27th	14.5	2	13	Cash-545

**(Scenario 4 data: Consultancy Associate’s study at E-commerce Company in Chennai)**

The conclusion is that the situation by splitting customers on the basis of Card or Cash, has made it worse. This option is also rejected.

**SCENARIO 5- Increasing the number of Cash Counters**

Counters	6	7	8	9	10	Date
Max Waiting Time ( Min )	8.1	3.3	1.4	0.8	0.3	April 25th
Average Waiting Time ( Min )	1.6	0.12	0.02	0	0	April 25th
Max Customers waiting	18	8	4	4	1	April 25th
Max Waiting Time ( Min )	45	5.8	3	1.5	1	April 26th
Average Waiting Time ( Min )	14.9	0.8	0.1	0	0	April 26th
Max Customers waiting	93	15	7	4	3	April 26th
Max Waiting Time ( Min )	11.5	4.5	2.2	0.8	0.4	April 27th
Average Waiting Time ( Min )	1.85	0.3	0.07	0.01	0	April 27th
Max Customers waiting	24	12	6	2	1	April 27th

**(Scenario 5 data: Consultancy Associate’s study at E-commerce Company in Chennai)**

This simulation experiment showed that increasing the number of customers from 6 counters to 8 counters, would solve the issue as the maximum waiting period during peak hours is reduced to 3 minutes.

This was the solution the CEO could consider to increase the counters from 6 counters to 8. The owner was happy to consider the solution to increase the number of counters to 8 during peak hours as a way achieve high customer satisfaction by reducing the waiting time to 3 from 45 minutes and reducing the customer length to 7 from 93 in the peak period of 27th April.

**Major Findings**

Averages mislead- The average values of customers arriving at every 0.5 minutes, in Scenario 1 mislead the analysis, as the average time intervals do not have sufficient information to determine peak waiting times and respective queue lengths.

Hence it is proper to analyze the raw data than the average data.

Raw data is always more important and informative... As in Scenario 2, we used values from Table no 1, which was the raw data provided by the Manager. This showed actual values of waiting times and waiting customers in peak business hours.

Large waiting times and queues usually occur during a small period of 3 days... This is a small sample of time period of 3 days, critical for retailer as it is at the end of week. The CEO and the owner as well need to be prepared for such small peaks, as their goal is win the customers’ loyalty and maintain brand value. Such small successes will add value to the yearly business targets.

Maximum values of Waiting Time and Number of customers ...guided the way than the average values of these parameters.

This has helped the key to management capacity to deal with the waiting customers during peak period in retail industry.

**Experience of buying behavior related with BRAND-**

During their experience of such studies, it is also revealed that when a customer perceives a brand as his needed and selected one, he or she does not compromise for anything less anything more. They will get satisfied after receiving their selection only. Deterrents like price, delay in receipt will be secondary, but they need only THAT BRAND. This is a behavioral reading of a consumer for a BRAND.

Digital Twin Service to Retail and Manufacturing and C Suite engagement

As outsourcing, integrated systems with B2B as a strategy, the strategic alignments are looked by C-level executives only. The speed and depth of such decisions are making the total industrial networks aligned to the higher volumes and wide variety of products.

This helps C-Level executives to have better control and make smart decisions through real time data communication, BIW like LUMIRA, simulate and monitor the physical set up without being near to it.

This digital twin is an exact digital replica of your setup, service. The living model creates the thread between physical and digital world.

Faster and more efficient Supply Chains will only be able to be responsive with minimum waiting times. These are at POS, production machines and Supplier to the global markets. It results in lower raw material and FG inventory.

C- Level management drives their business models with these keys --- Minimum Waiting Times to build their Brands. This is also the reason of using simulations as strategic decision and is being done by their Management at top. Earlier the functional level engineers have been doing this with Excel sheets as a job. This is a limited tool. The assumption that Excel spread sheets can analyze complex manufacturing, warehousing, supply chains prove to be a very expensive loss prone assumption.

With simulation, today's production as well as service operations can manage better fit with optimized lines. There are several inter dependencies involving material handling, product routing, randomness in data, shift timing, manpower parameters, space constraints to name a few. B2B operations can look for better coordination with simulation only as the scenarios are getting more complex. It saves manpower, material and money to its best. Modern factories and warehouses regularly use machinery like conveyors, ASRS, AGVs and Robots and transport goods in factories which understand technology. It is therefore necessary to adjust to current and future realities in analytical technologies. C Suite Management knows to adapt for their own survival and success always.

They are not going where the path leads, but going where there is no path but there will be a trail which they will engrave. It will have cascading effect on how businesses are operated to win safely & profitably. This trail will lead our lives.

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