

# Transplanting "Flexible Manufacturing System" to a Satellite Restaurant Business Model

Dr. Anthony Nap-man CHAN

General Manager Greater China, Hong Kong 5-S Association, [HKSAR](#)  
[achanhk5sa@gmail.com](mailto:achanhk5sa@gmail.com)

## ABSTRACT

Based on the PhD Dissertation Paper "Application of Green Gemba Management to the Restaurant Business in Hong Kong & Mainland China for the Sustainable Development" in 2014 to NEUST, there comes opportunities for authors to test out and verify the model in some restaurants who are applying both Green 5-S Model (both 5-S and Lean 5S, each has 50 points checklists) in Hong Kong and China Mainland. As a result, the aim of this paper is to share the experience of the Green 5-S Model applied to Restaurant Business for Sustainable Development since 2012. Moreover, a major case study was conducted to investigate if there are some correlation between the Green 5-S practice with Flexible Manufacturing System (FMS) for a Satellite Restaurant. The experience will be shared in this article.

**Keywords:** Green Gemba Management, Restaurant Business, Flexible Manufacturing System

## 1. Introduction

This case study is the course assignment of CMA program, which is to identify skill sets learned in "Strategic Cost Management". It is also served as a continuity of my PhD research topic - "Application of GREEN GEMBA Management to the Sustainability of Restaurant Business in Hong Kong and China Mainland".

"Hua Hui Rice Roll" (华辉拉肠) is a fast food restaurants chain provides mainly rice roll, congee, and steamed rice, which now has over 40 shops in Guangzhou, China. When it started in 1998, it offered a new breeze with modern shop design, clean environment and high efficient food readiness to the market. This made them easily surpassed the famous 70 years old local player YinJi (which only has 6 shops at that moment) to become the market leader in Guangdong Province. In 10 years' time, they stretched their muscle in different dimensions - opens new shops, builds central kitchen, develops new restaurant brands in Szechuan style, Guangdong dim-sum as well as Hong Kong style, and even upgrade some of their existing shops into luxury version, which all fulfill the management objectives in revenue growth and profit maximization. During 2011, Hua Hui has reached its peak with shops number around 60+, some were even opened in Shenzhen and Dongguan. The management has then introduced "5-S Checklist" (Ho, 2013, see appendix), which was the reinvention from the *Japan 5S Practise* (Ho, 1989, TQM An Integrated Approach, see appendix A ) to improve and maintain areas in hygiene, safety, efficiency, quality as well as service levels for their *sustainable development* (WCED, 1987 report Our Common Future, see appendix and references).

The great turning point came in end of 2012, with Xi Jin Ping became the Chief Secretary of Communist Party of China in November. From 2013, China government's large and full scale anti-corruption and frugality policies have deeply impacted the country's economy. Business activities have slowed down leading to people's expenses were greatly reduced. Hua Hui's revenue has then dropped almost 10-15% in 2014 and showed no sign of recovery onward. In addition, fierce competition from YinJi's revitalization, other new rising players as well as new online business model also reduces Hua Hui's original market share more than 25%.

On the other hand, internal cost factors like high wages, strict social welfare and environmental rules, and increasing food cost also deeply eroded their profit margins. All in a sudden, the combined business loss has been up to 1/3 from its peak.

## 2. Benchmarking

Market intelligence below showed the gaps between their major competitor YinJi are narrowing from 2015, some are even worse than:

Shops Number	HH	YJ	Rev/Shop /month	HH	YJ (est.)	Net Profit /Shop/month	HH	YJ (est.)
2014	49	17		440,000	370,000		13,000	9,000
2015	47	28		420,000	360,000		12,000	9,000
2016	45	33		410,000	390,000		12,000	12,000
2017 9Q1)	44	39		410,000	450,000		10,000	14,000

\*Information from Hua Hui management

Hua Hui management saw their survival bottle neck from above **“external benchmarking”**. Business consulting has been introduced in Aug 2016 and immediately conducted an internal “SWOT” analysis with the followings to be found via **“internal benchmarking”** and some market research:

1. Top 5 kinds of food in own menu customer mostly ordered;
2. Top 5 kinds of food in own menu with highest revenue;
3. Top 5 kinds of food with highest profit;
4. Top 5 kinds of food with least revenue;
5. Top 5 kinds of food with least profit;
6. Top 5 kinds of food customer like but not yet in menu;
7. Top 5 kinds of food offered by competitor(s)

## 3. Lean Management & Quality Control

### 3.1 “Lean 5-S Checklist”

In order to fight against the “to live or die” challenge, “Lean Management”, originated from Toyota Production System (Ohno, Taiichi, 1998, see reference) was in first priority to be deployed to improve both revenue and profit. In midyear of 2014, an easy to use **“Lean 5-S Checklist”** (Ho, 2013: see appendix), targeted to increase revenue and reduce cost both by 10%, was actually introduced to the organization, but was never seriously executed. Now with the consultants in place, certain “Lean 5-S” components are deployed immediately:

L1.1 – Customers’ Feedback => Significant High “Price vs Value Ratio” (the most important core value)

Hua Hui decided to win back the business by not only meets, but exceeds customers’ desire on high price value ratio, i.e. let customers “feel” that value they have received is much more than they have paid. Here value means everything includes food quality, quantity, prestige, dining comfort, customer services and food serving speed etc.

According to the above internal benchmarking, certain new food types are re-engineered or re-invented to be “perceived” at 150% value, so that more revenue and profit by increasing numbers of orders and customer turns.

Food Type	In Existing Menu	Price New vs Old in RMB	How It Looks
Rice Roll w/ shredded meat & Fish Soup	Yes	12 / 10	

Fish Soup Congee w/ assorted inwards	Yes	14 / 12	
Fish Soup Flat rice noodle w/ fish ball	No	18	
Fish Soup Rice stick w/ assorted inwards – Szechuan style	No	24	
Chicken Rice Hainan style	No	29	

\*Information from Hua Hui management

On the other hand, food in SWOT analysis with least revenue and profits were removed from menu to saved cost and resources.

L1.2 – The Blue Ocean Strategy => Avoid cut-throat competition by re-invent new cuisine factors  
 One of the shop that has least profit (diminished to only RMB2,000 when closed down in Apr 2017) are to be re-invented to a new brand “The Fish Soup Expert (广味小馆-鱼汤专门店)” which Guangzhou did not have such cuisine type at that moment. The new shop was re-opened in mid-July 2017 after renovation, and has been operated over 4 months offered to the market a new breeze.

L1.4 & L1.5 – Over Design & Purchase/Add-value => what you think or believe may not be the same as customers want  
 Certain legacy concepts have retarded Hua Hui management to think out of the box. For example, Guangdong has been very famous in fresh chicken cuisine and management refused to accept use of frozen chicken; similar concept towards beef is believed to induce health imbalance. As a result, consultant stood firm to use frozen chicken in the cuisine, and to offer super value beef rice roll in the menu. Both food types proved to be very popular from revenue and profit point of view due to higher price value ratio.

While value has been greatly increased, other cost-down “Lean 5-S” components and objectives are implemented at the same time and tabulated as below:

	“Lean 5-S” Components and Objectives	What have been done in the trail “Fish Soup Expert”
L2.5	Just in Time – a “Cost Management”	Except certain taste ingredients at minimum level, all major raw or semi processed food are limited to be delivered from suppliers only for 1 day usage so as to maximize freshness, space usage, easy process handling and cash flow enhancement. Also 10 key food costs (fish, chicken, pork, meat balls...) are sourced around non-stopped with monthly evaluation to ensure cost-down always in place.
L3.1	Idle Labor – a “Production Re-engineering”	Front end customer services employee are also trained to help out kitchen simple food preparing during non-busy hours to avoid idle labor and to maximize HR utilization to save labor cost.

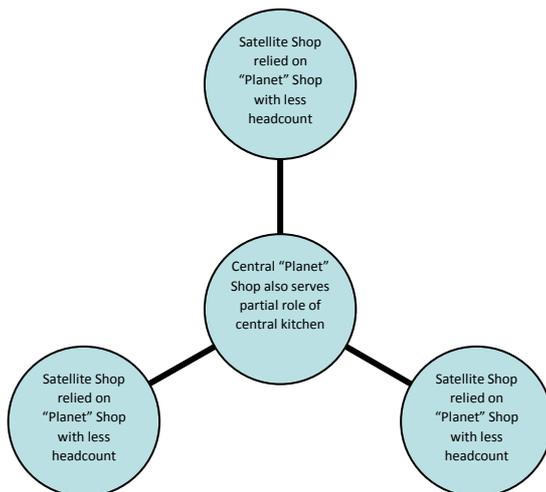
L4.3	Energy Saving – Gas + Heat	Collect steam from boiler and recycle back to water tank below to shorten water heat up time and hence save energy cost
L7.2	4-M Coordination	New system with POS, kitchen order placing and readiness and CRM are all integrated in place so that acute customer taste trend can be collected to avoid costly business mistakes
L8.5	Fool proofing	New noodle boiling pots with temperature control & timer are used to avoid rice noodle over cooked to ensure quality consistency and standardization,
L9.1	Avoid over-stocking	Further space usage enhancement via previous learned 5-S practice.
L10	Revenue/Profit from Customer Satisfaction	“Free next time if order expired 15 minutes” and “10% off coupon if dine finished within 30 minutes” will be launched after Chinese New Year 2918 to increase revenue via customer satisfaction.

### 3.2 FMS/FMD – Flexible Manufacturing System/Design

This will be the new business model that Hua Hui will be applied to the future “Fish Soup Expert” restaurant chain. It actually was an accidental discovery from Hua Hui management together with the business consultant during this trail deployment.

In previous Hua Hui operations, all raw food was ordered by the central kitchen in bulk for better deal. After processing there, the semi-finished product will then be sent to the 40+ shops to fulfill 2-3 days’ business requirement. Large amount of cost in production (rent, wages, machinery and capital opportunity cost) were tied up in such centralized process, which also became a drag of feet to Hue Hui sustainable development. Miles of delivery distant is also an indirect cost to the whole restaurant chain.

The trail business Fish Soup Expert needs lots of flexibility for their new cuisine market touch. Existing central kitchen supply model, similar to scale of economy in manufacturing, is a relatively much bigger production scale and not able to fulfill such flexible requirement. Also the significant cost of production above will also be induced to Fish Soup Expert and hence not able to reflect the real profit and loss situation of the new model.



Therefore, in addition to ally with the L1-L3 components of “Lean 5-S” management tool above, the first trail Fish Soup Expert is also ready to serve as the center of “**Satellite or Cluster Model**”. What it means is when the business of this trail shop has become stable in another 2 months, a second Fish Soup Expert restaurant will be opened within 2~3 kilometers with a smaller kitchen scale. Kitchen in the first trail shop will act as the “mini central kitchen role”, which now has its independent supply chain and food

processing for self-consumption, should be capable to scale up its productivity and supply to the newly opened shop. Such model is targeted to expand up to a maximum of 4~5 shops cluster (1 bigger vs 3 smaller) within a 2 kilometers radius. In such a way, all costs within the 4 shops are count together and can be significantly average down.

Furthermore, no extra production or cooking machinery will be needed in either the center or a peripheral shop. Headcount may only be up one or two in the center shop, but their salaries can be diluted within the cluster. Delivery distance is largely reduced. The most important gain is operation flexibility can be highly enhanced compared to the rigid central kitchen model, which is the core winning factor in today's business survival.

#### 4. Customer Profitability Analysis

Food delivery/Take-away used to be a major revenue compliment to restaurants in-house dining. It has now been boosted into an independent high growth business via enormous capital burning online apps in mainland China. In late 2014, Hua Hui has also outsourced their food delivery services Meituan, an online ordering platform covering 30+% market shares. Their food delivery revenue has increased >50% compared to first half of that year, whereas the existing headcount for food delivery can be minimized on the other hand. It was seen to be a very good decision at that moment.

However, as online food delivery is extremely price sensitive and competitive, it gradually becomes a red ocean market. Hua Hui's online order customers become "Profit Under-achievers", and profit is further eroded by the 25% delivery charges from Meituan on each delivery deal. Furthermore, delivery orders also eat up the revenue as well as productivity from individual shop which originally is designed for in-house dining. The situation now becomes a dilemma opportunity decisions to Hua Hui management. Hence they are in stage of redesigning new attractive but easy to cook manual tailor for such new war (not a battle in existing in-house dining) in order to maximize revenue from this new breeze.

#### 5. Results & Conclusion

So much mentioning what has been implemented to Hua Hui's Fish Soup Expert trail; let's look at the result from its opening in mid July 2017:

Fish Soup Expert	Revenue RMB	Profit RMB	Remarks
July	180,000	-3,000	Half month@6 hrs trail, still in tuning.
August	430,000	-20,000	Revenue increase. Loss due to internal and resources re- allocation.
October	490,000	80,000	Starts to on track. 7 days National Day holiday has a small negative impact
November	560,000	85,000	Revenue on track, higher profit due to headcount fine tuning
December	620,000	88,000	Revenue keeping up due to people's year end higher spending, expecting even better in Jan in 2018 before Chinese New Year.

\*Information from Hua Hui management

In Conclusion, from the five and a half months results shows Fish Soup Expert seemed to be in a right direction. Continuous tuning will be carried on to ensure performance optimization. The skill sets covered in CMA courses – Benchmarking, Lean Management, Flexible Manufacturing Design as well as Customer Profitability Analysis have been deployed in such project, helping it to move towards a positive direction. Hence we are looking forward to see further Strategic Cost Accounting skill sets implementation to provide further good results to Hua Hui management.

**APPENDIX-A: The ISO-HK5SA 5-S® Audit Checklist (ver.13; Jan 2013)**

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5-S	What (every audit needs to be supplemented with a digital photo of around 1MB, landscape, with date)	Where	How (✓/ X)	Who	When
<b>S-1: Structurise (Seiri)</b>					
1.1	Throw away/return things which are not needed (>1year)				
1.2	<b>3-R: Reduce, Re-use, Re-cycle &amp; paperless</b> , etc.				
1.3	“Needed things” stored: low, medium & high usage/wt.				
1.4	Personal belongings kept to the minimum				
1.5	Treat defects, leakage, breakage and their causes				
1.6	1-is-best #1: Daily “Things-to-do” List				
1.7	1-is-best #2: one set of tools/stationery/1-page form				
1.8	1-is-best #3: one hour meeting (be concise)				
1.9	1-is-best #4: one stop service for customer				
1.10	1-is-best #5: one location for files, server & material				
<b>S-2: Systematise (Seiton)</b>					
2.1	Everything has a clearly designated name & place				
2.2	Every place should have a ‘responsible person’ label				
2.3	Security on doors & cabinets and key management				
2.4	Functional placement for leaflets, tools and material				
2.5	Filing standards and control master list				
2.6	First in, first out arrangement (always left in, right out)				
2.7	Zoning, placement marks, signage and badges				
2.8	Neat notice boards (including zoning and labels)				
2.9	Easy-to-read notices (include expiry date)				
2.10	30-second retrieval of tools, document & parts				
<b>S-3: Sanitise (Seiso)</b>					
3.1	Individual cleaning responsibility assigned				
3.2	Make cleaning and inspection easy (15cm above floor)				
3.3	Clean the places most people do not notice (anti-SARS)				
3.4	Cleaning inspections and correct minor problems				
3.5	Regular sparkling cleaning campaigns				
<b>S-4: Standardise (Seiketsu)</b>					
4.1	Transparency (e.g.: minimize doors, covers & locks)				
4.2	Straight line, right-angle and leveling arrangements				
4.3	'Danger' warning, fire extinguisher & exit sign/map				
4.4	Dangerous goods, mechanical safety measures				
4.5	Workplace work instructions and ‘passed’ labels				
4.6	Electrical wiring neatness and switch labels				
4.7	Energy Conservation – Aircon temperature mark/switch				
4.8	Physical handling standards and instructions				
4.9	Colour & Visual Mgt. -- paper, files, containers, etc.				
4.10	5-S responsibility labels on floor plan or at site				
4.11	Prevent noise, vibration, hazards & ensure food safety				
4.12	Exercise Safety Policy and Risk Assessment				
4.13	Fool-proofing (Poka-yoke) Practices				
4.14	Park-like environment (garden office/factory)				
4.15	5-S & OSH Museum (including photos before/after)				
<b>S-5: Self-discipline (Shitsuke)</b>					
5.1	Execute individual 5-S responsibilities				
5.2	Wear suitable clothing/safety helmet/gloves/shoes/etc.				
5.3	Good communication & phone practices (magic-word)				
5.4	Do 5-minute 5-S Practice daily				
5.5	One day processing of job/tasks (see 1.6)				
5.6	First-Aid box and practise dealing with emergencies				
5.7	Organisation Chart and Performance Indicators				
5.8	Design and follow the 5-S Manual				
5.9	Quarterly 5-S Audit and Improvements				
5.10	Seeing-is-believing and Keep It Short & Simple (KISS)				

### Appendix-B: Definition of Sustainable Development

“development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (Smith & Rees, 1998).

### Appendix-C: Lean 5-S Audit Checklist: 10 Operations & 5 Steps Approach (2012)

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Firm Audited : \_\_\_\_\_ Date : \_\_\_\_\_

Auditee: \_\_\_\_\_ Mob. : \_\_\_\_\_ Email: \_\_\_\_\_

Auditor: \_\_\_\_\_ Mob. : \_\_\_\_\_ Email: \_\_\_\_\_

L5S Checklist	Change	L5S Checklist	Change
<b>L1: Design</b> 1.1 Customer Feedback 1.2 Blue-ocean Strategy 1.3 80/20 Rule 1.4 Over-design 1.5 Purchase/Add-value	+10% _____% _____% _____% _____% _____%	<b>L6: Machine Maintenance</b> 6.1 Breakdown 6.2 Spare equipment 6.3 Maintenance Staff 6.4 Obsolete 6.5 Maintenance is Free	-10% - ____% - ____% - ____% - ____% - ____%
<b>L2: Forecasting</b> 2.1 Produce > Sales 2.2 Sales > Produce 2.3 Overtime Rate 2.4 Idling Capacity 2.5 Just-In-Time (JIT)	+10% _____% _____% _____% _____% _____%	<b>L7: Flow Method</b> 7.1 Bottleneck 7.2 4-M Co-ordination 7.3 Non-stop Flow 7.4 Delay in delivery 7.5 Flow KISS & Merge	+10% _____% _____% _____% _____% _____%
<b>L3: Men &amp; Materials</b> 3.1 Idling HR 3.2 Unfit HR 3.3 Expensive Purchases 3.4 Cost of Men/Materials 3.5 Plan at 101%	-10% - ____% - ____% - ____% - ____% - ____%	<b>L8: Quality</b> 8.1 1-10-100 Rule 8.2 DIRFT 8.3 5 to 6-σ 8.4 Don't Get, Make & Send poor Quality 8.5 Fool-proofing	-10% - ____% - ____% - ____% - ____% - ____%
<b>L4: Utilities &amp; Tax</b> 4.1 Water + Sewage 4.2 Electricity + Aircon 4.3 Gas + Heating 4.4 Computer & Telecom 4.5 Tax Reduction	-20% - ____% - ____% - ____% - ____% - ____%	<b>L9: Stock Control</b> 9.1 Over-stock 9.2 Loss stock, loss money 9.3 Dead-stock is loss 9.4 Poor control leads to Cheating 9.5 Loss sales, loss profit	-10% - ____% - ____% - ____% - ____% - ____%
<b>L5: 5-R for Material/Machines</b> 5.1 Refuse 5.2 Reduce 5.3 Re-use 5.4 Re-cycle 5.5 Replace	-10% - ____% - ____% - ____% - ____% - ____%	<b>L10: Floor and Space</b> 10.1 Floor area is expensive 10.2 Space for storage 10.3 High/Mid/Low Usage 10.4 Park-like setting 10.5 Happy Customer brings Profit	+10% _____% _____% _____% _____% _____%
<b>Profit arise from +% ➔</b>	_____%	<b>Saving arise from -% ➔</b>	_____%

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## Author's Background



*Dr. Anthony Napman Chan is the General Manager, Greater China, Hong Kong 5S Association. He holds an BSc Letter & Science – Statistics & Computer Science. (U. of Wisconsin-Madison, USA) and MBA (U. of Northern Virginia., USA, and PhD in Business 2014 (NEUST, HK Graduate Campus). He is a Platinum Belt Green 5-S Auditor in Hong Kong. Commercial wise, he has been in regional senior position in various multi-national corporates like Lagercrantz, Cisco, Tyco & AT&T.*