

TECHNOLOGY IN FOOD VALUE CHAIN

Yuan Wenqian, See Xin Yi, Lew Huey Lee, Chua Jianyong, Dr. Leong Lai Peng, Cliff Tham



OUTLINE

- Introduction to Singapore
- Food value chain
 - Production
 - Manufacturing
 - Distribution
 - Consumer
- Conclusion

INTRODUCTION



Main races

Chinese (74.3%)
Indians (9.1%)
Malays (13.3%)
Eurasians (< 2%)



Main languages

Bahasa Melayu
English
Mandarin
Tamil **Singlish**

TECHNOLOGY IN FOOD VALUE CHAIN

INTRODUCTION

“Eating-out” culture

The latest National Nutrition Survey conducted by the Health Promotion Board in 2010 showed that six in 10 Singaporeans eat out at least four times a week.



SATAY



KUEH LAPIS



CURRY FISHHEAD



NASI LEMAK



**CHILLI
CRAB**



CHICKEN RICE

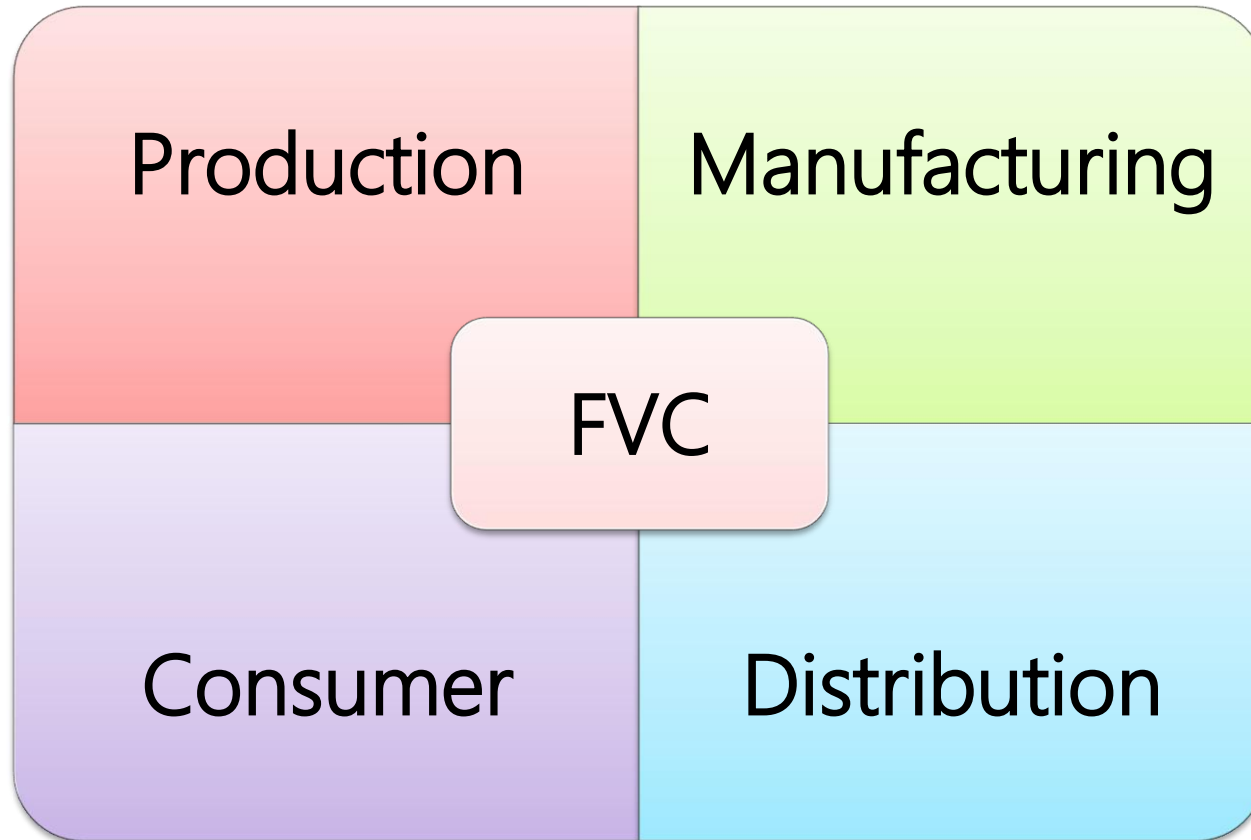


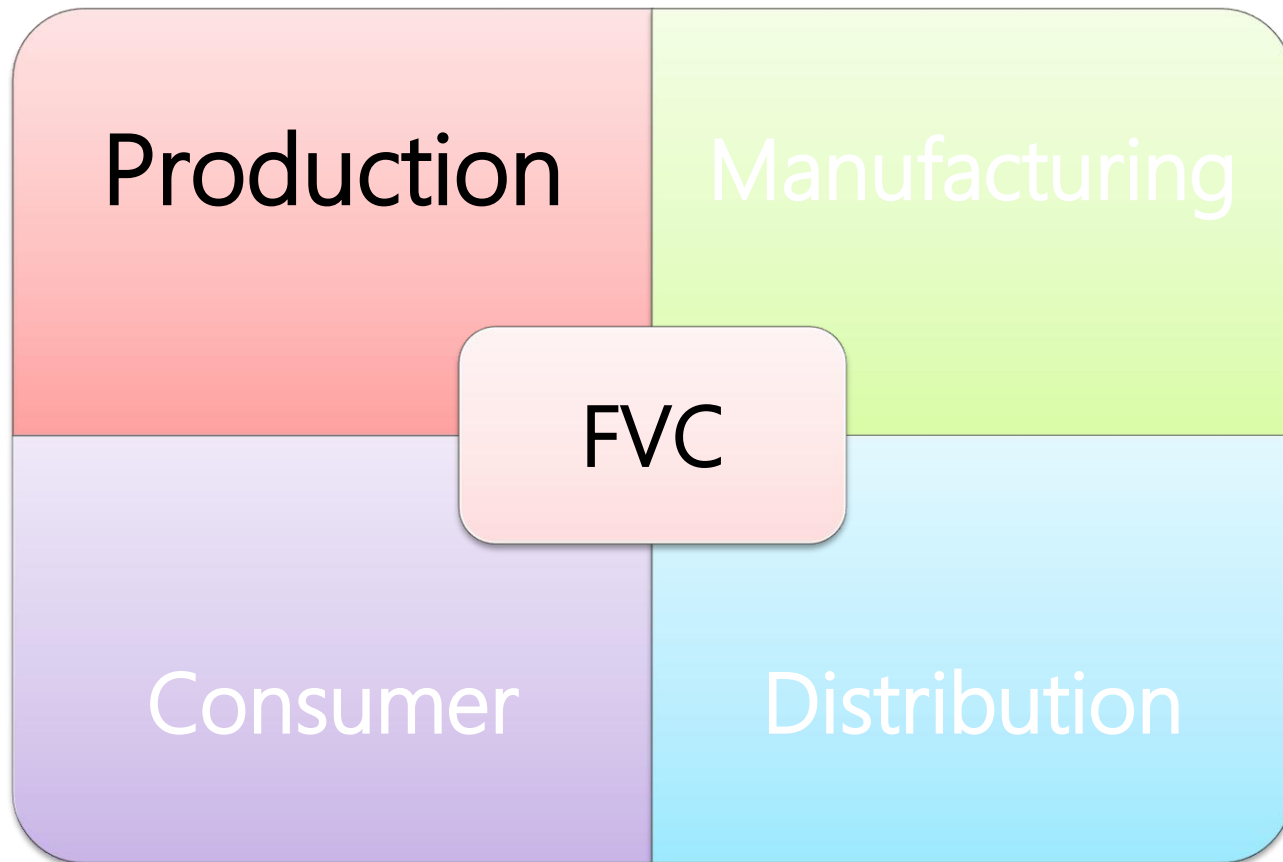
HOKKIEN MEE



LAKSA

TECHNOLOGY IN FOOD VALUE CHAIN





PRODUCTION

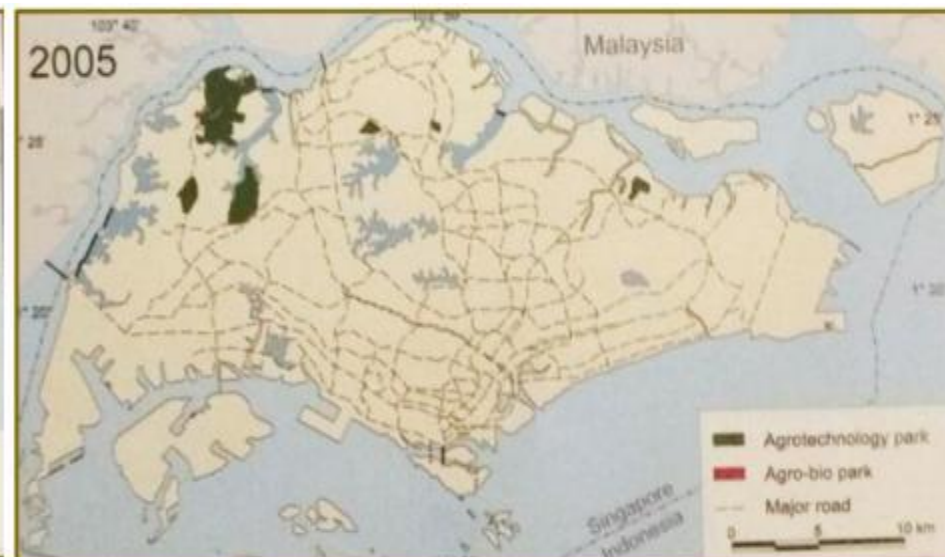
Current Challenges

1) Limited Land

< 1% agricultural area

2) Labor Shortage

1% agricultural workers



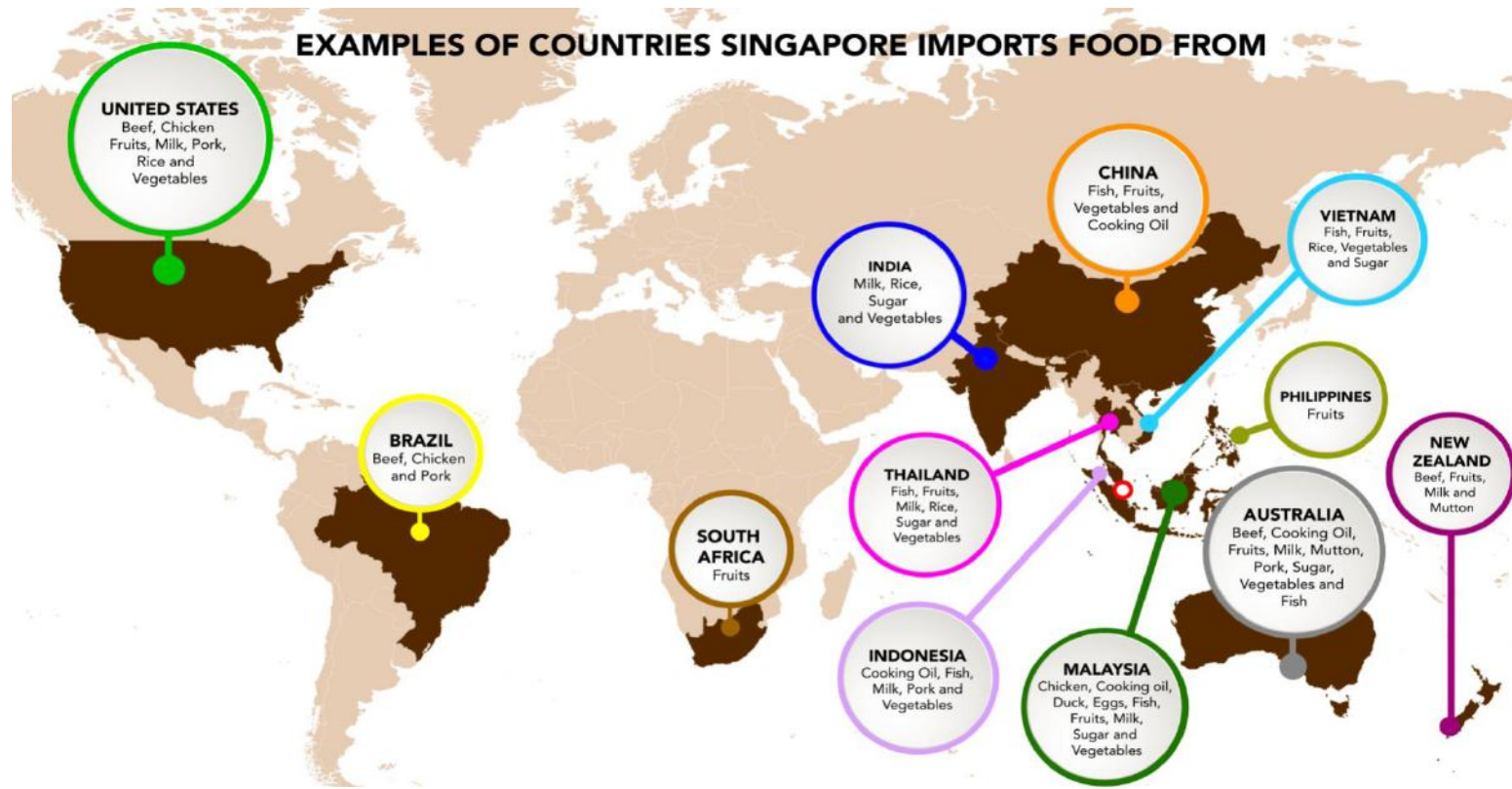
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PRODUCTION

Current Situation

> 90% imported foods

Food Security

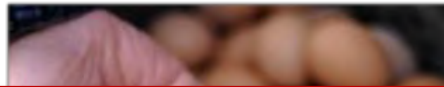


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PRODUCTION

Aim

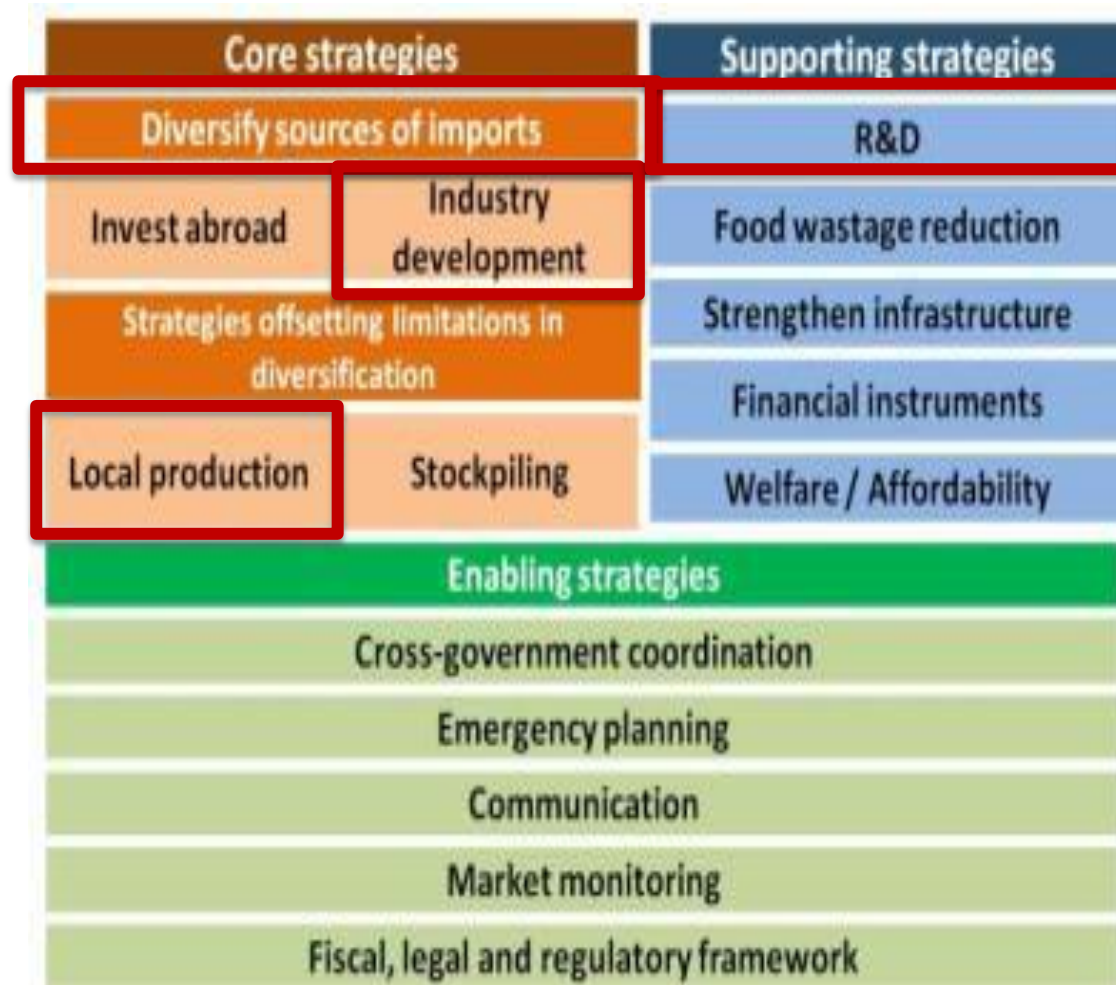
self-sufficiency:



High-tech
agriculture,
Greater
productivity



Food Security Roadmap



TECHNOLOGY IN FOOD VALUE CHAIN

PRODUCTION

Research and Development (R&D)

Collaboration: Government - Institution - Private

- AVA
- NUS, NTU, A*STAR
- Panasonic

Agrotechnology Park

High-tech agricultural farms (<20)

- In-door (LED)
- Vertical farming



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PRODUCTION

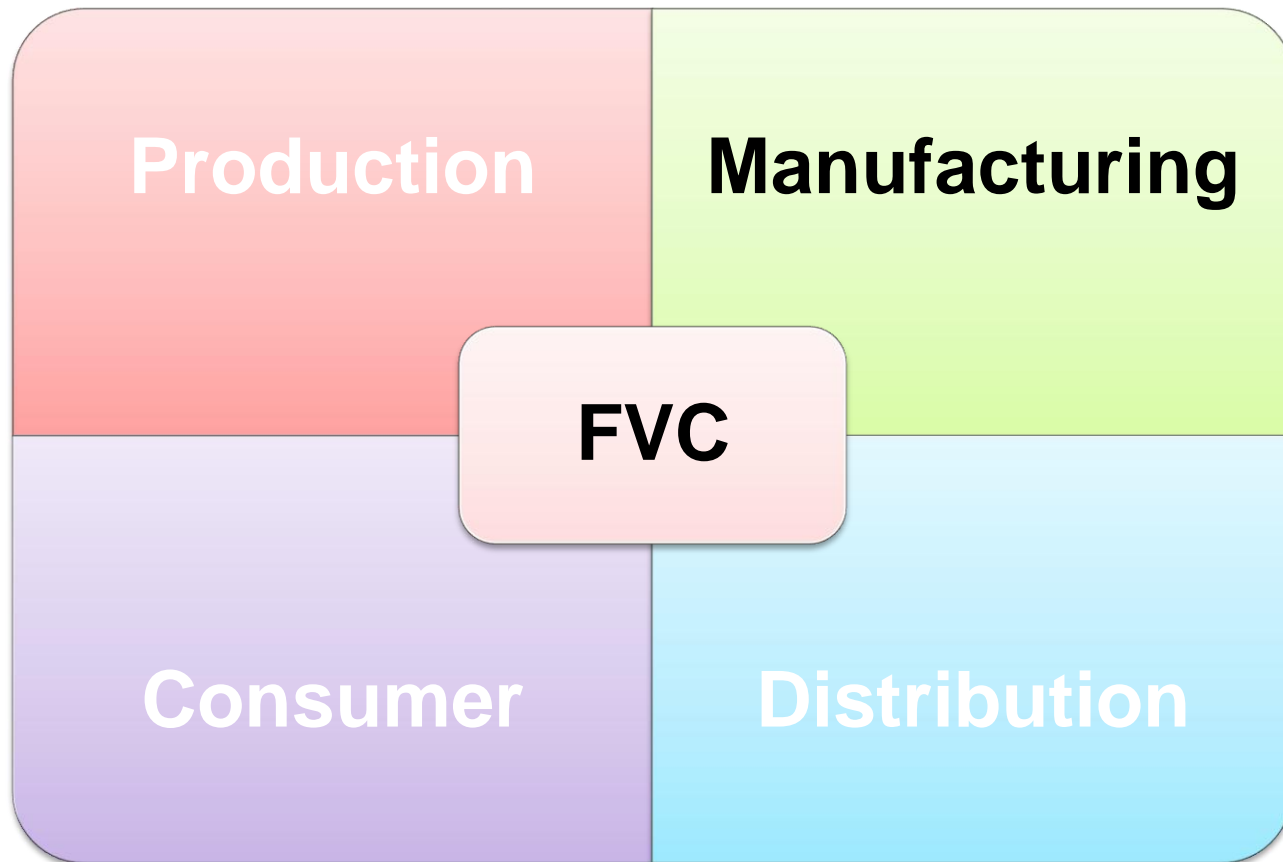


Magnetic Refrigeration
- seed storage



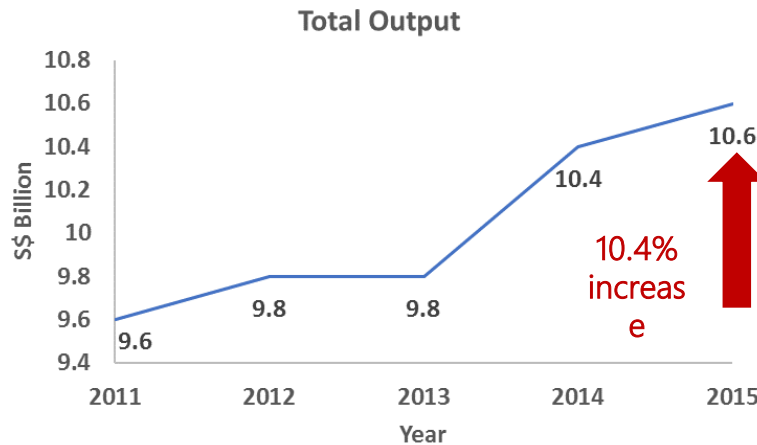
Centralized In-door Germination
- controlled environment
- LED





FOOD MANUFACTURING IN SINGAPORE

2015



Workforce = 30,550
GDP Contribution = 1% (3.7 billion)

(2015, Food, Beverage and Tobacco Manufacturing)

By 2020

SPRING
singapore
Enabling Enterprise



Productivity 4.5% Annually

2000 New White-collar Jobs

SOURCE: ECONOMIC DEVELOPMENT BOARD & SPRING SINGAPORE

POLICIES THAT BOOST TECHNOLOGY ADOPTION



S\$4.5 billion Industry Transformation Map *(~¥370 billion)*

1. **Automation Support Package (ASP)**
 - Increase deployment of automation and robotics solutions
2. **National Robotics Programme**
 - Provide customized technological solutions to support development and growth needs
3. **Food Innovation Cluster (FIC)**
 - Establishment of shared R&D and production facilities

SOURCE: SPRING SINGAPORE

SHARING HIGH PRESSURE PROCESSING FACILITY

THE STRAITS TIMES

No preservatives or heat for new food processing method



Commonwealth
CAPITAL

Swissbake



The Soup
Spoon

Preserves freshness, taste,
colour and nutritional
value

↑ Processing speed

No/Less preservatives

SOURCE: THE STRAITS TIMES

CENTRAL KITCHEN FACILITY



Japanese Fast Food



Highly Automated
Production
1207 outlets



Soy Milk

THE STRAITS TIMES

Milking technology for all it's worth
as Mr Bean expands



↓ 90% drop in no. of workers
↑ Productivity 6000%
More than 50 outlets

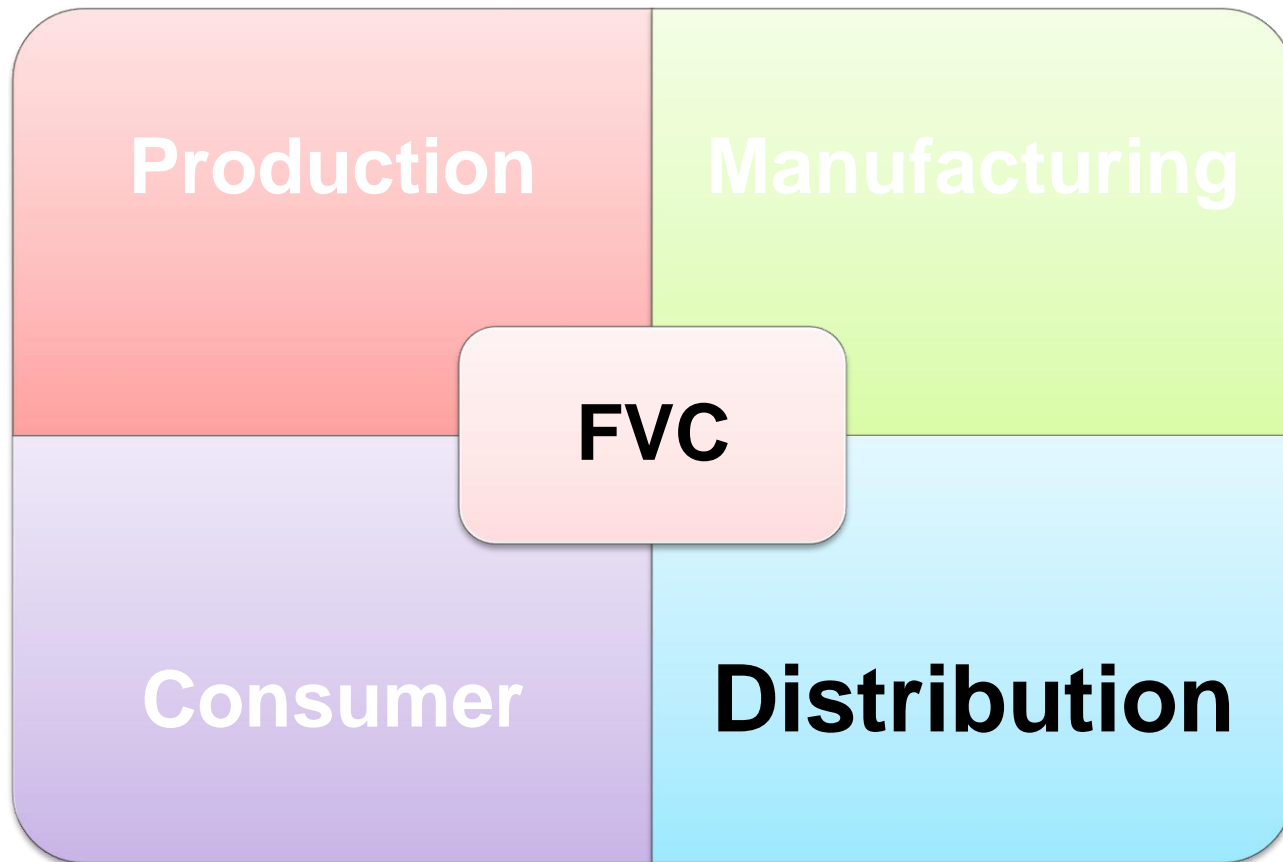
SOURCE: YOSHINOYA OFFICIAL WEBSITE & THE STRAITS TIMES

TECHNOLOGY IN TRADITIONAL FOOD




kikkoman





FOOD DISTRIBUTION IN SINGAPORE



Jurong Fishery Port



Pasir Panjang Wholesale center
(S)

TECHNOLOGY IN FOOD VALUE CHAIN

FOOD DISTRIBUTION IN



Flower Auction



Farm Produce auction

COLD CHAIN SYSTEMS IN SINGAPORE

- Introduced in 1999
- Enhanced food safety, businesses 'sustainability and reduce food wastage



SINGAPORE CASE STUDY: NTUC ISO STANDARDS



COLD CHAIN STANDARD

A background image showing a refrigerated display case in a grocery store, filled with various packaged food items.

STANDARDIZED PALLET

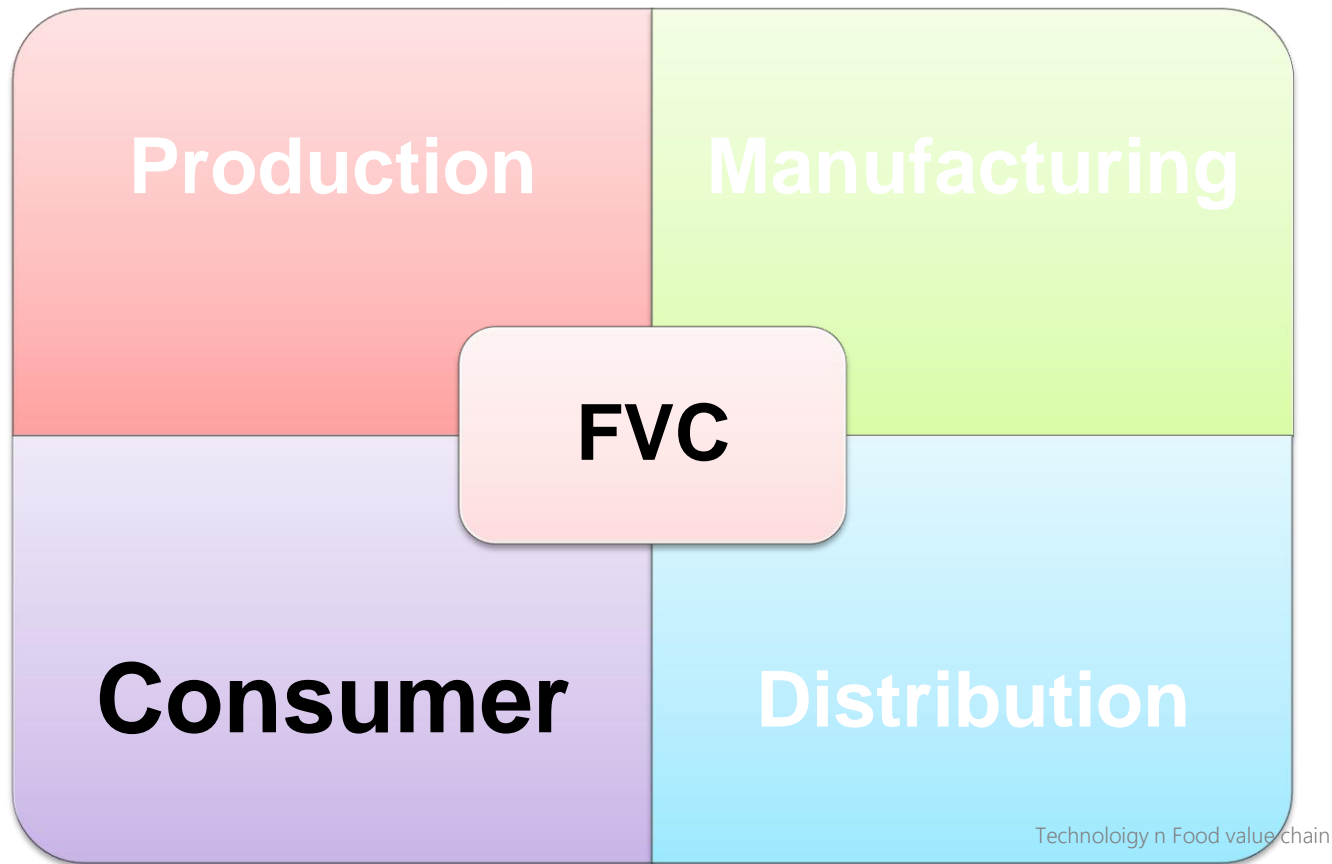
A background image showing a warehouse setting with a forklift operator moving a pallet loaded with large cardboard boxes.

**STANDARDIZED
CARTON BARCODES**

A background image showing a close-up of a barcode scanner with red laser lines, used for tracking and inventory management.

Source: <https://www.youtube.com/watch?v=UKfNHq1v16w>

TECHNOLOGY IN FOOD VALUE CHAIN



CONSUMERS – EFFECT OF HIGHER LEVEL OF

	Japan	Singapore
Total population	126,702,133	5,781,728
Literacy*	99%	96.8%
School life^	15 years	13 years
Education expenditure	3.8% of GDP	2.9% of GDP

* age 15 and over who can read and write

^ Primary to tertiary education

Updated and estimated as of July 2016

Source: Central Intelligence Agency (US)

Double-edge
sword!

CONSUMERS – EFFECT OF HIGHER LEVEL OF EDUCATION



44 years of history
Closed on 30th June 2017

SOLUTION TO MANPOWER SHORTAGE: **AUTOMATION!**



Singapore: Hawker centre at Ci Yuan Community Centre



Japan: Kishimen (きしめん) self-ordering machine

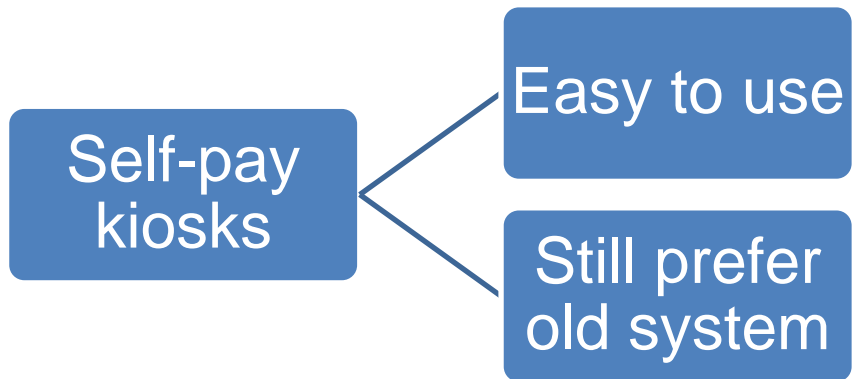
Similarities	Differences	
	Singapore	Japan
Reduce manpower	Cash only	Both cash and card
Increase efficiency	Payment only	Both ordering and payment
Increase hygiene		
Diversion of workers to other area		

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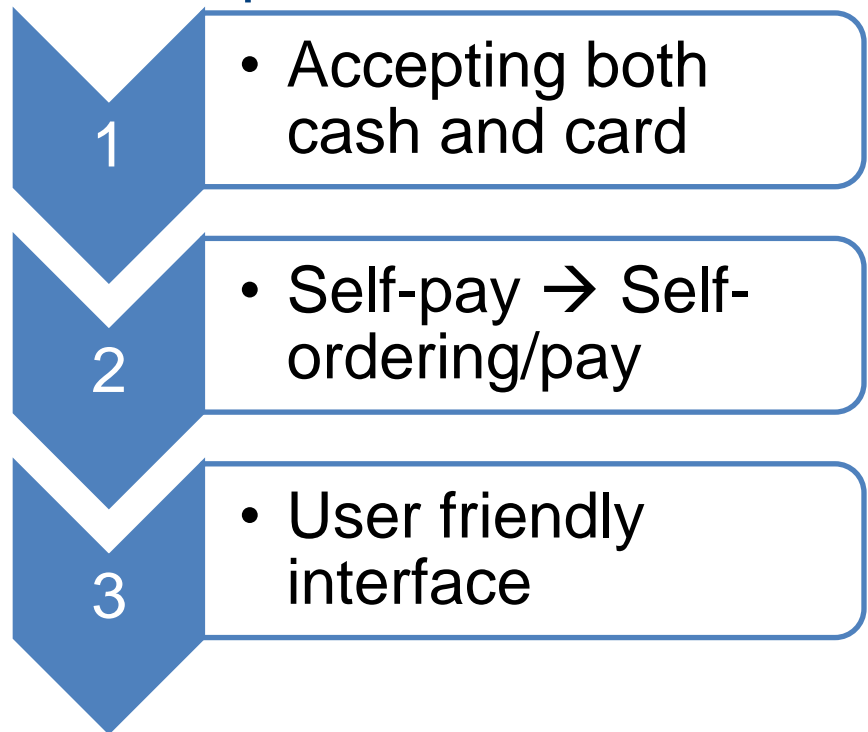
OUTCOME OF SELF-PAY KIOSKS IN SINGAPORE



Singaporean's reactions



What Singapore can learn from Japan?



IN A NUTSHELL...

Preserving tradition while embracing technology



Supporting local produce



Business is not just about earning money, but also need to consider the people and environment



ACKNOWLEDGMENT



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Organiser: Afh,
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Uchida and Hiroshi
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Tour guides
& translators

Hosts: Nagoya
University Students
and lecturers

New Friends from the various
ASEAN universities and
government representative



The warm hospitality of the Japanese we met in all the companies
we visited and all the places we went.

THANK YOU
ありがとうございます
感谢
மிக நன்றி
TERIMA KASIH