Food Innopolis

Driving Research Development and Innovation for Thai Food Industry

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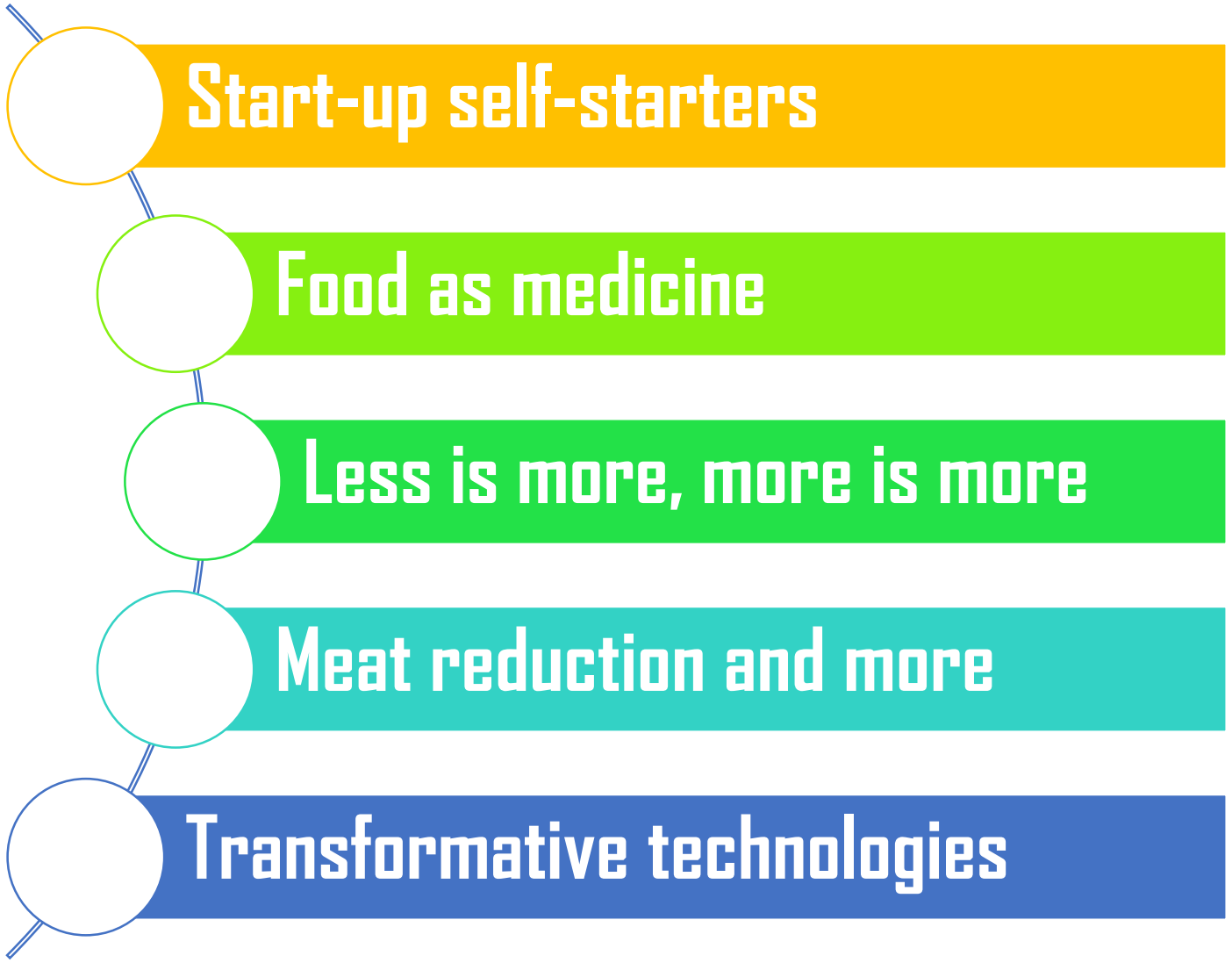
Assistant Secretary General,
National Science Technology and Innovation Policy Office,
and Chief Operation Officer, Food Innopolis

Mega Trends & The Future of Food Industry

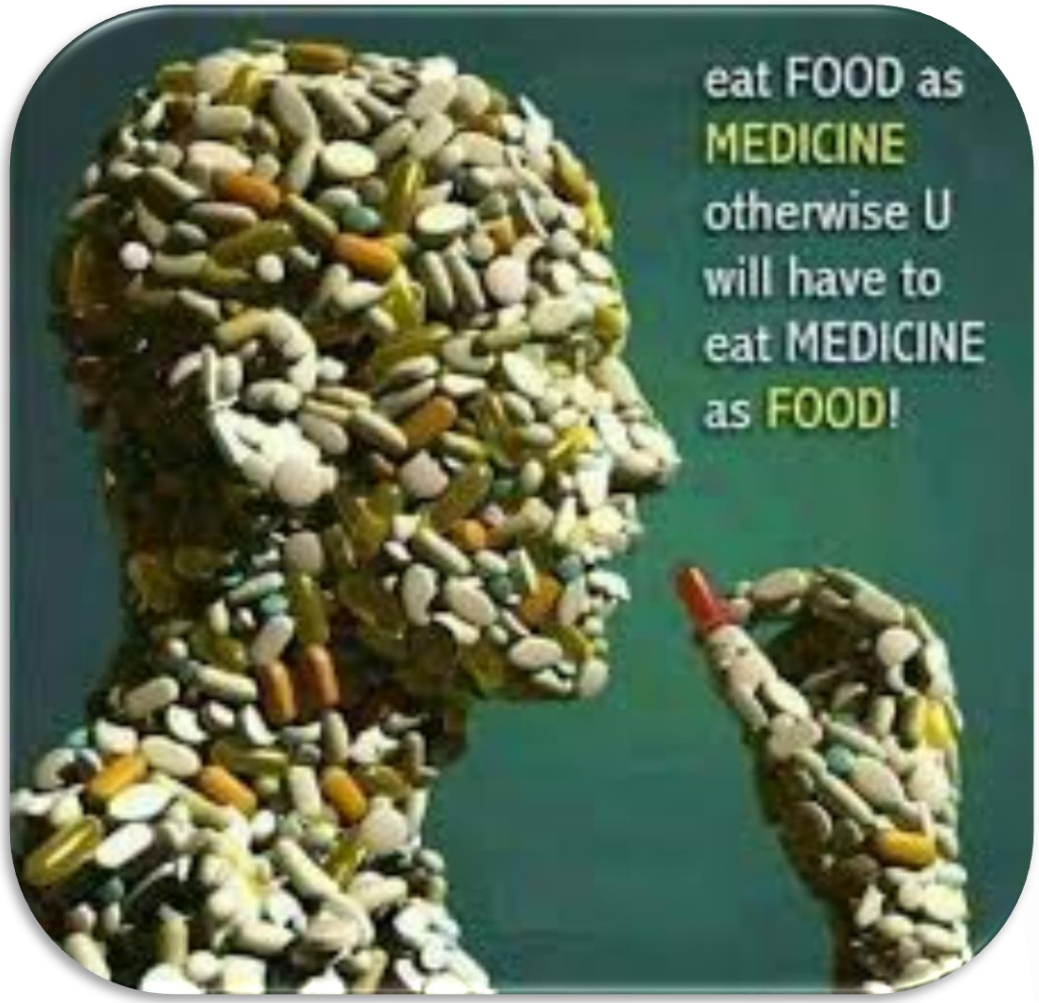
5 Mega-trends set to shape food industry in 2018 and beyond



https://www.foodnavigator.com/Article/2018/01/03/2018-and-beyond-Five-mega-trends-set-to-shape-the-food-industry

Start-up self-starters

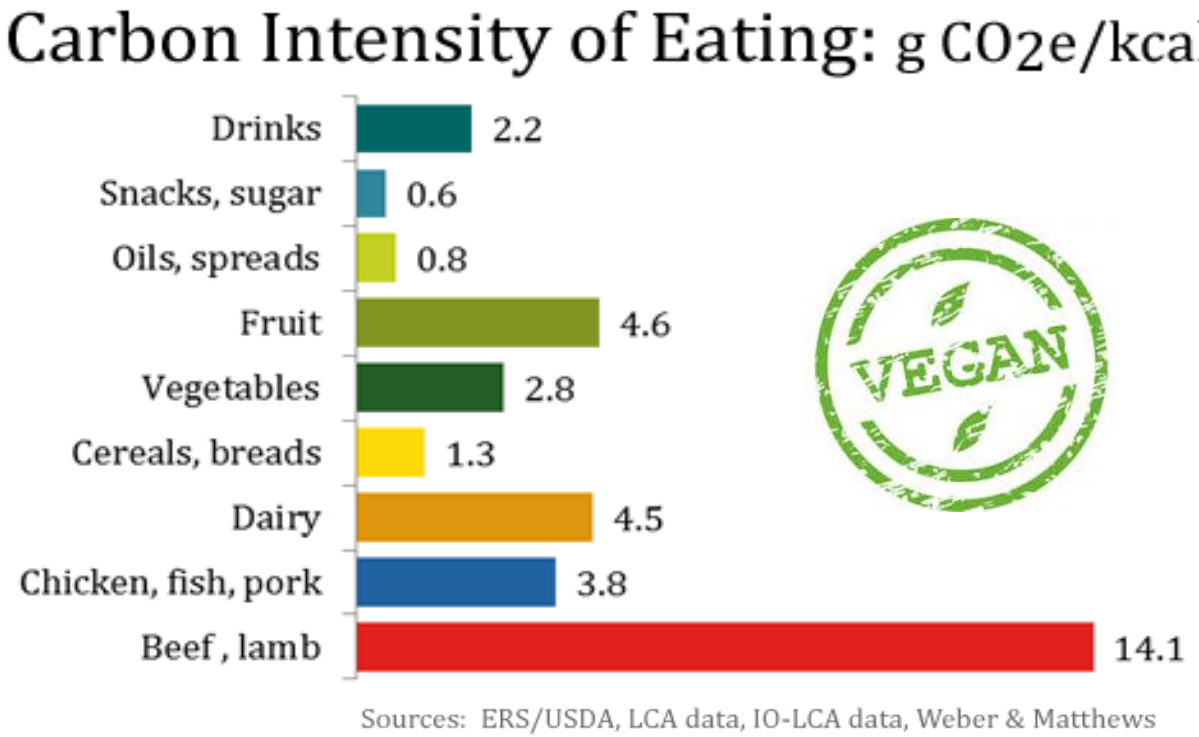
Food as medicine



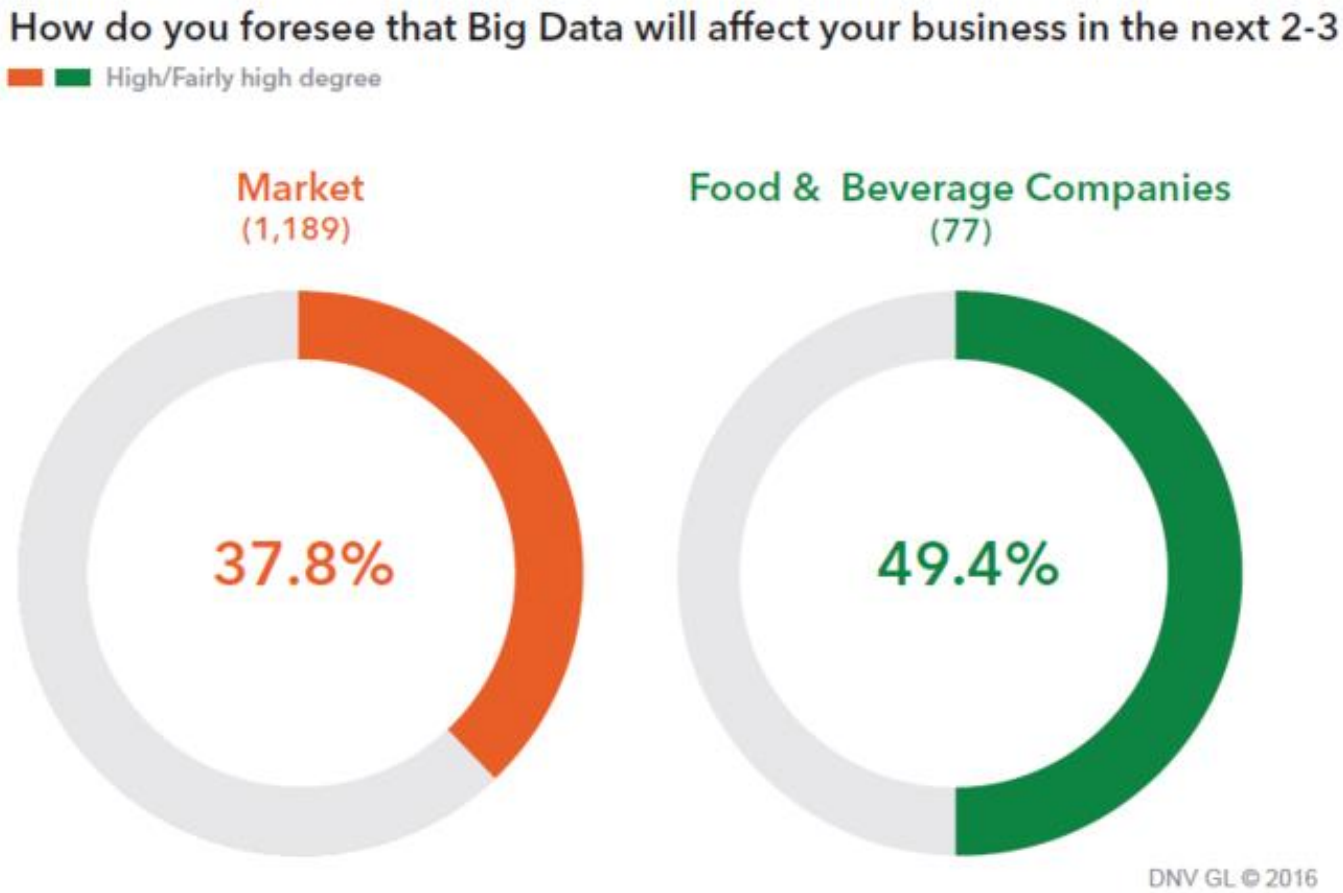
Less is more, more is more

Meat reduction and more

Mintel report shows that strong growth observed in EU markets (e.g. Germany, UK and France)



Transformative technologies



THE FUTURE OF FOOD

Food retailing and production are changing around the globe. From how food is designed and where it's grown, to how it's consumed and who is consuming it. ***Food production system is likely to look very different in the future, lessening waste and expanding our food base***

DIGITAL PLATFORMS

URBAN AGRICULTURE

FOOD-AS-A-SERVICE

VERTICAL FARMING

DNA-BASED DIETS

LAB-GROWN MEAT

(Source: The Future of Food - New Realities for Industry, by Accenture

https://www.accenture.com/us-en/_acnmedia/PDF-70/Accenture-Future-Of-Food-New-Realities-For-The-Industry.pdf)

THE NEXT GEN OF FOOD SYSTEMS

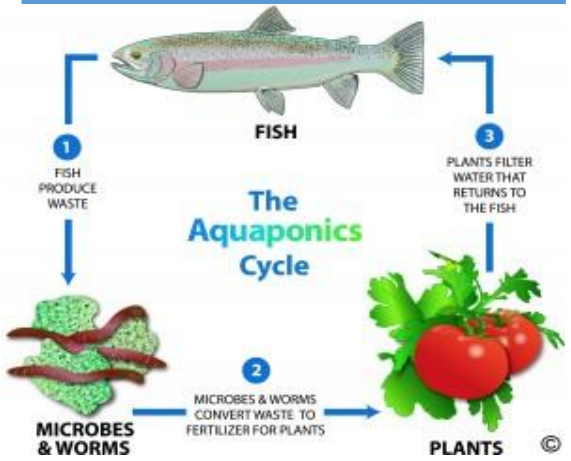
Four technologies that may have a profound effect on how we eat in the future

100x more effectively per acre than conventional agricultural techniques. Twice the speed as usual, while using 40% less power, 80% less food waste, and 99% less water than outdoor fields.

Automated Vertical Farming

A unique combination of fish farming (aquaculture) with hydroponics. It uses about half of the water of conventional farming, while increasing the yield of the crops grown.

Aquaponics

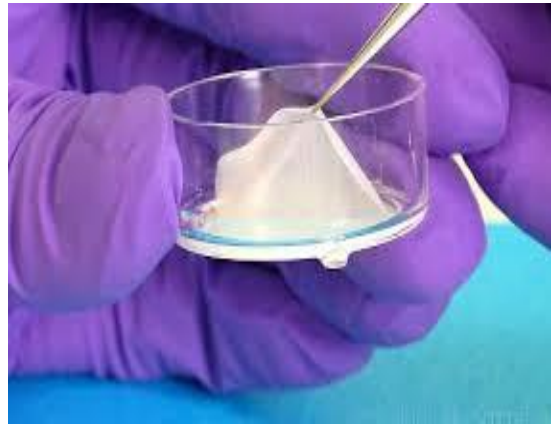


Meat is costly and extremely resource intensive to produce. Self-replicating muscle tissue cultures are grown and fed nutrients in a broth

In Vitro Meats

Use machine learning to grasp the complex chemistry and textures behind meat products, and to find ways to replicate them.

Artificial Animal Products



Source: http://www.visualcapitalist.com/future-of-food/

The future of the food production system

Global protein demand will increase

Replace farms and factories with laboratories.

Design food & drink that is inherently more nutritious

Entirely new sources of food

- *Quarter of UK consumers who agree that meat substitutes that are similar in taste, texture, and/or appearance to real meat appeal to them.*
- *70.6% of US consumers are interested in trying lab grown beef.*
- *Technology could be eventually used to scientifically engineer food and drink to reach nutrition conscious consumers*

Consumers increasingly want local food

Urban farming

- *"in-store farming" and local manufacturing of products*
- *Today, 200 million urban farmers supply food to 700 million people, approximately 12 % of the world's population.*

Digital solutions and advanced data analytics is being used to improves yield, cut costs and increase crop resilience.

Add **drones and robotics**, to further improve productivity as well as reduce energy intensity.

Digitization of food

- *Precision agriculture uses digital solutions to improve monitoring and optimize inputs, boosting profitability in some cases by $55 to $110 per acre.*
- *Smart agriculture solutions will likely boost yields by 30 percent and potentially generate $2 billion in additional revenue to companies*

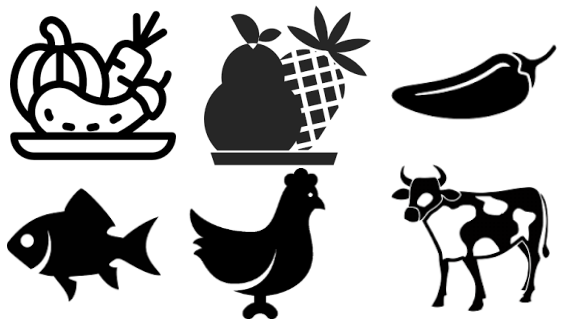
Source: (1) Mintel, Global Food & Drink Trends 2018, and
(2) The Future of Food - New Realities for Industry, by Accenture

Food Innopolis :

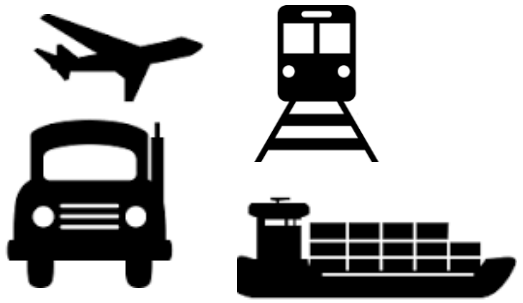
A Global Food Innovation Hub

Global Food Innovation Hubs

Great variety of Raw Materials

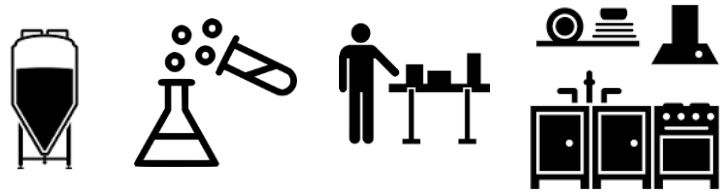


Strategic Location



Thailand As A Food Innovation Hub in ASEAN

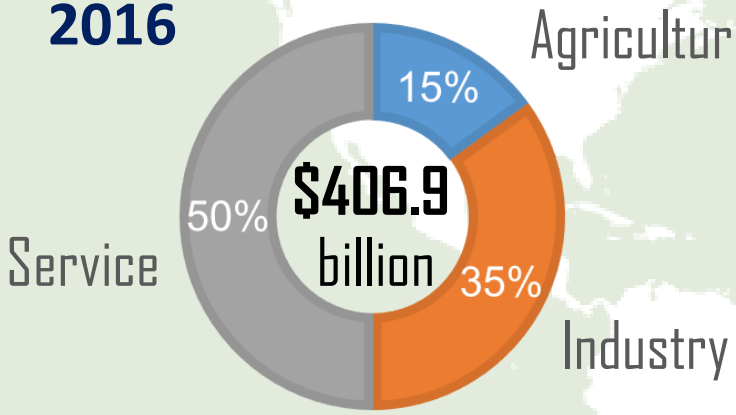
Excellent Research Capabilities and Human Resources in Food Science and Technology



Integrated Nationwide Resources and State-of-the-Art Facilities

THAI ECONOMY AT A GLANCE

GDP by sector :
2016



GDP :
2017f

Source: NESDB

R&D by sector :
(GERD in 2015)

Food
$364.35

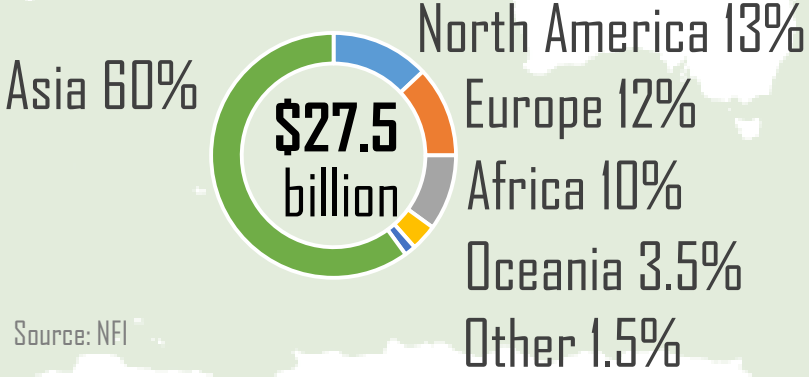
Automotive
$323.96

Chemicals
$144.66

Source: RDI Survey 2016 by STI

Export Value : $137.13 billion
2016 (expected +7% in 2017)

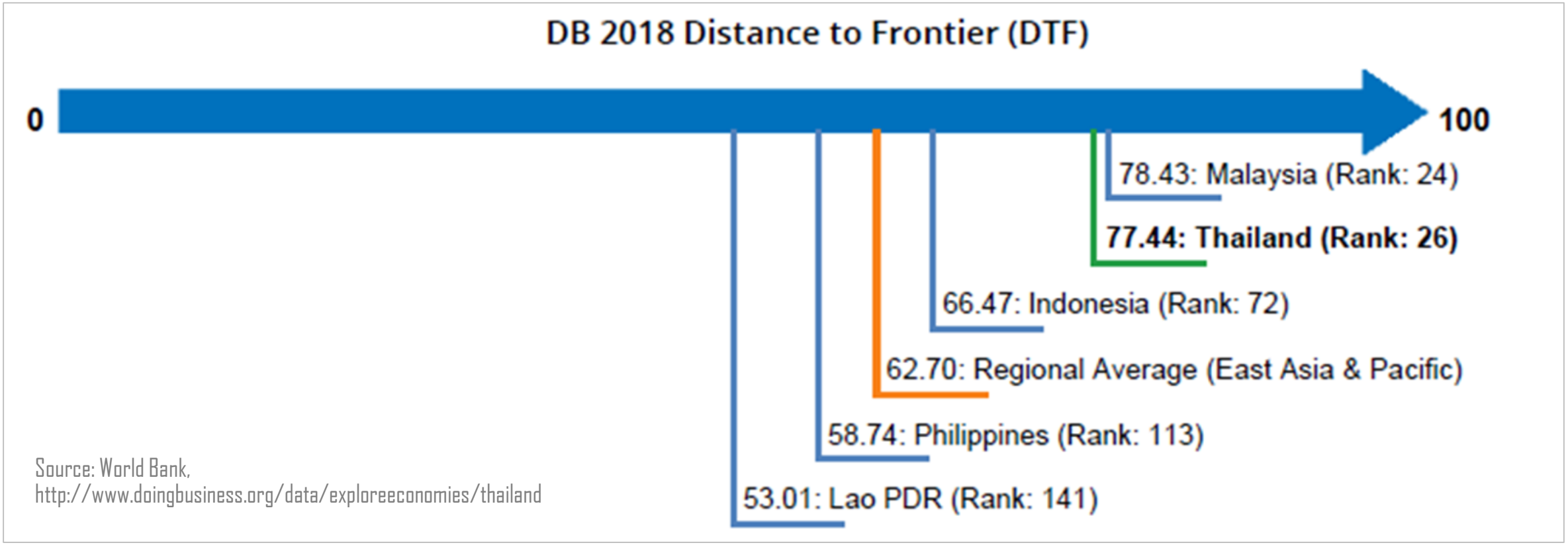
Food Export Markets :



Source: NFI

INCREASING EASE OF DOING BUSINESS IN THAILAND IN 2018

Ranked **26th** place this year among 190 economies(up from 48th place last year



Source: World Bank,
http://www.doingbusiness.org/data/exploreeconomies/thailand

Thailand 4.0

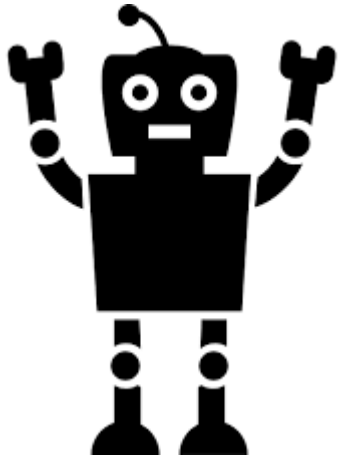
Health, Wellness
& Biomedical

Health and Functional Food

FoodInnopolis

Food Agriculture
& Biotech

Automation, Smart Farming

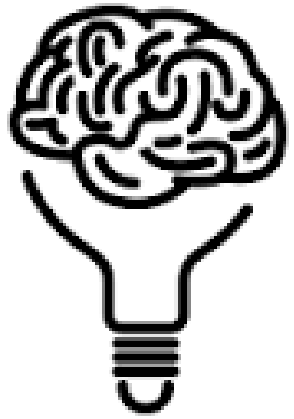


Smart Devices
Robotics & Mechatronics

Digital, IoT
Embedded Technology

Food Safety & Logistics

High Value Added Food Products



Creative, Culture
High Value Services

Biopolis, EECi

Food Valley, NL

VITAGORA, FR

Networking

Access to Funding and Facilities

FoodInnopolis

The only comprehensive food innovation platform in ASEAN.

Infrastructures

Pilot Scale Production, State-of-the Art Equipment

Research Scientist & Engineers

Agro Food Park, DK

FIN, NZ


Customers
Competitors
Innovation Centers
Open Innovation Platform
University
Talent Mobility
Suppliers

National Initiative: Inter-Ministrial Platform

- 16 Private Companies
- 23 Universities
- 12 Government Agencies

Harmonization of government offices, private companies and academic institutions both from international and domestic with public-private-partnership mechanisms.

เป้าหมายเมืองนวัตกรรมอาหาร ภายในปี 2564*

- **ดึงดูดการลงทุน RDI ด้านอาหาร**
  จากทั้งบริษัทไทยและต่างประเทศเข้ามาในพื้นที่เมืองนวัตกรรมอาหาร
- **ยกระดับความสามารถ SMEs และ Startups**
  ให้เชื่อมโยงกับห่วงโซ่อุปทานอาหารของโลกได้อย่างมีประสิทธิภาพ
- **Food Research and Innovation Hub**
  สำหรับอุตสาหกรรมอาหารและเป็นแหล่งจ้างงานบุคลากรวิจัย
- **ปรับเปลี่ยนโครงสร้างอุตสาหกรรมอาหารของไทย**
  จากการผลิตสินค้าและบริการที่ใช้แรงงานเข้มข้นมีมูลค่าเพิ่มต่ำ ไปสู่สินค้าและบริการที่มีมูลค่าเพิ่มสูง โดยใช้ วทน. อย่างเข้มข้น

(หมายเหตุ : * ตามมติ ครม. เมื่อ 16 พ.ค. 2559)

100 บริษัทอาหารเข้ามาลงทุน RDI ในพื้นที่ Food Innopolis

100 FoodTech Startups

35,000 ล้านบาท มูลค่าการลงทุน RDI ของบริษัทในพื้นที่ Food Innopolis

270,000 ล้านบาท มูลค่าเชิงพาณิชย์จากงานวิจัยพัฒนาและนวัตกรรม

1,000 บุคลากรวิจัย ในพื้นที่ Food Innopolis และในอุตสาหกรรมอาหารที่เป็นการผลิตต่อเนื่องจากงานวิจัยพัฒนาที่เกิดขึ้นใน Food Innopolis อีก 3,000 ราย

Focused Areas

- **Healthy and functional food**
  e.g. Heath food, functional food, Silver food
- **High value added food products**
  e.g. food ingredients, food extracts,
  nutritional extract, halal food, organic foods
- **Supporting business for food innovation**
  e.g. packaging, automation, traceability,
  food safety, food storage and logistics

Within close proximity to National Research Centers

NSTDA

BIOTEC
a member of NSTDA

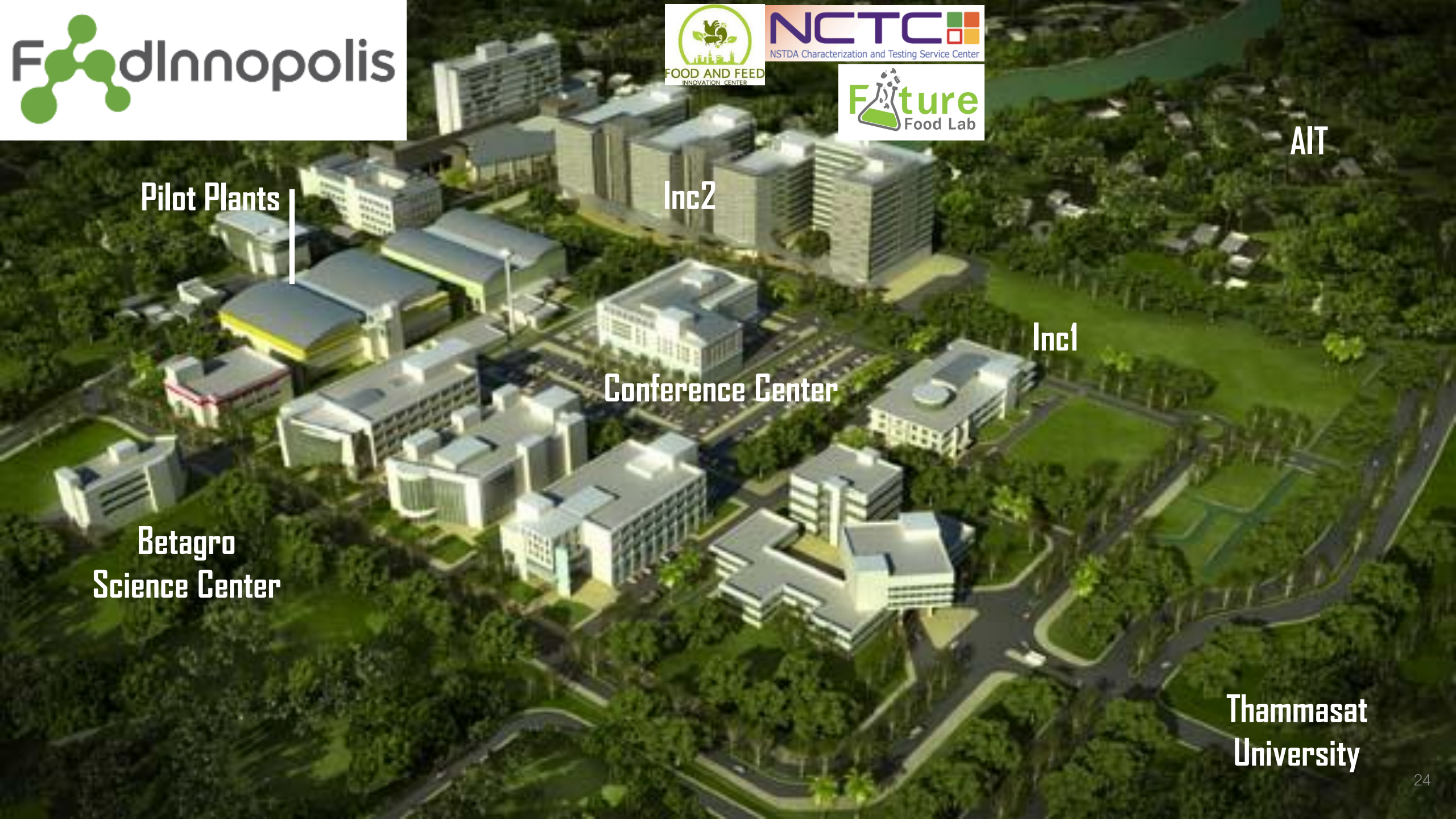
MTEC
a member of NSTDA

NECTEC
a member of NSTDA

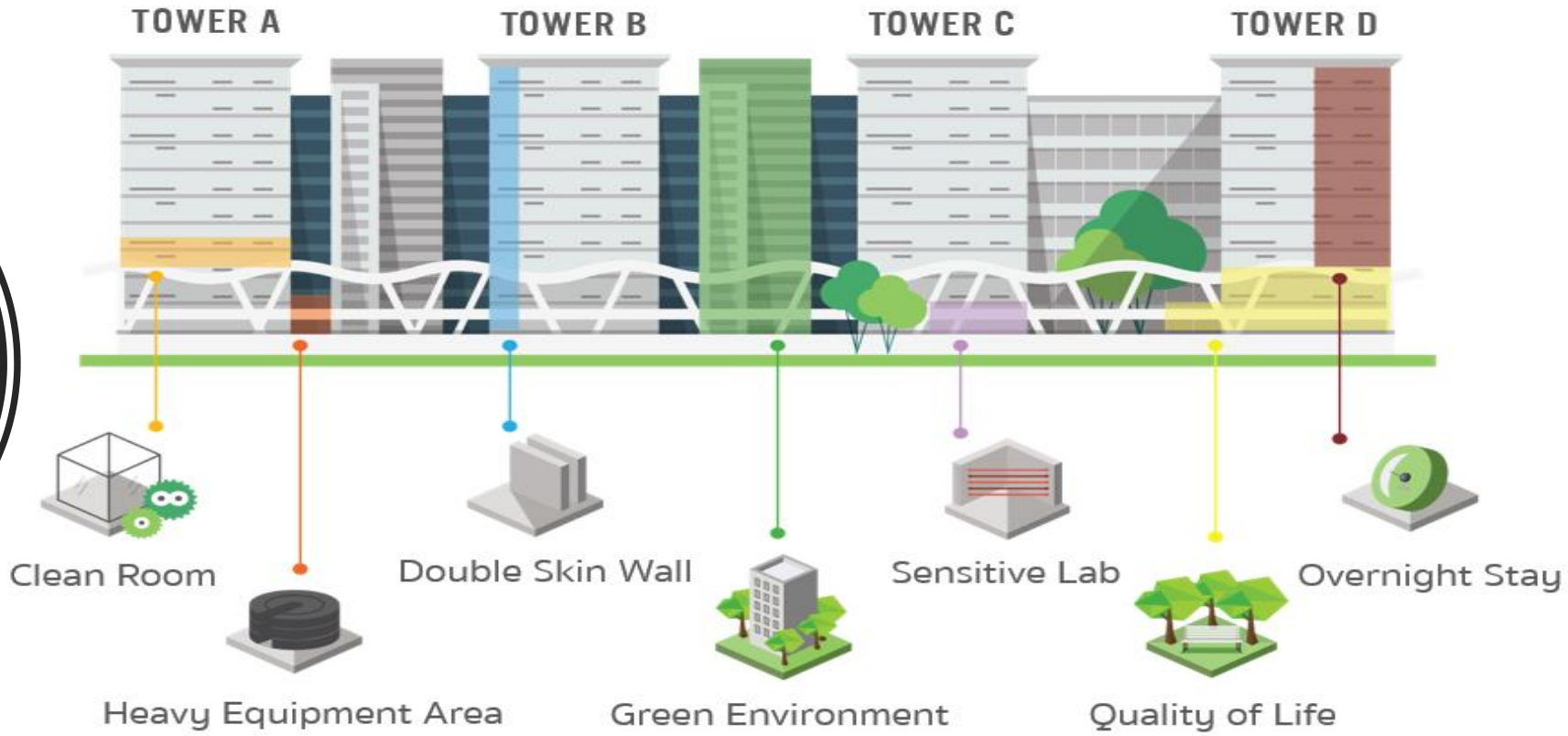
NANOTEC
a member of NSTDA

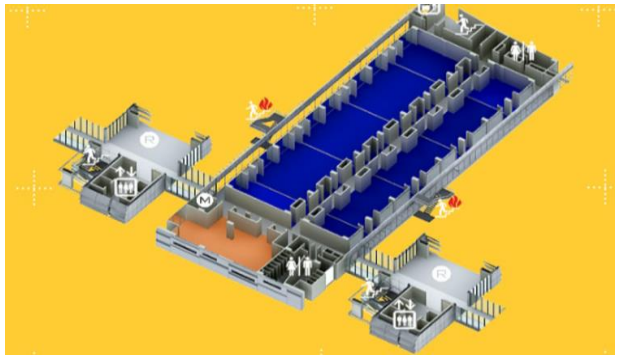
FoodInnopolis

At Thailand Science Park


FoodInnopolis
FOOD AND FEED INNOVATION CENTER
NCTC
NSTDA Characterization and Testing Service Center
Future Food Lab
AIT
Pilot Plants
Inc2
Inc1
Conference Center
Betagro Science Center
Thammasat University

Specially Designed Facilities





Modular Design Laboratory

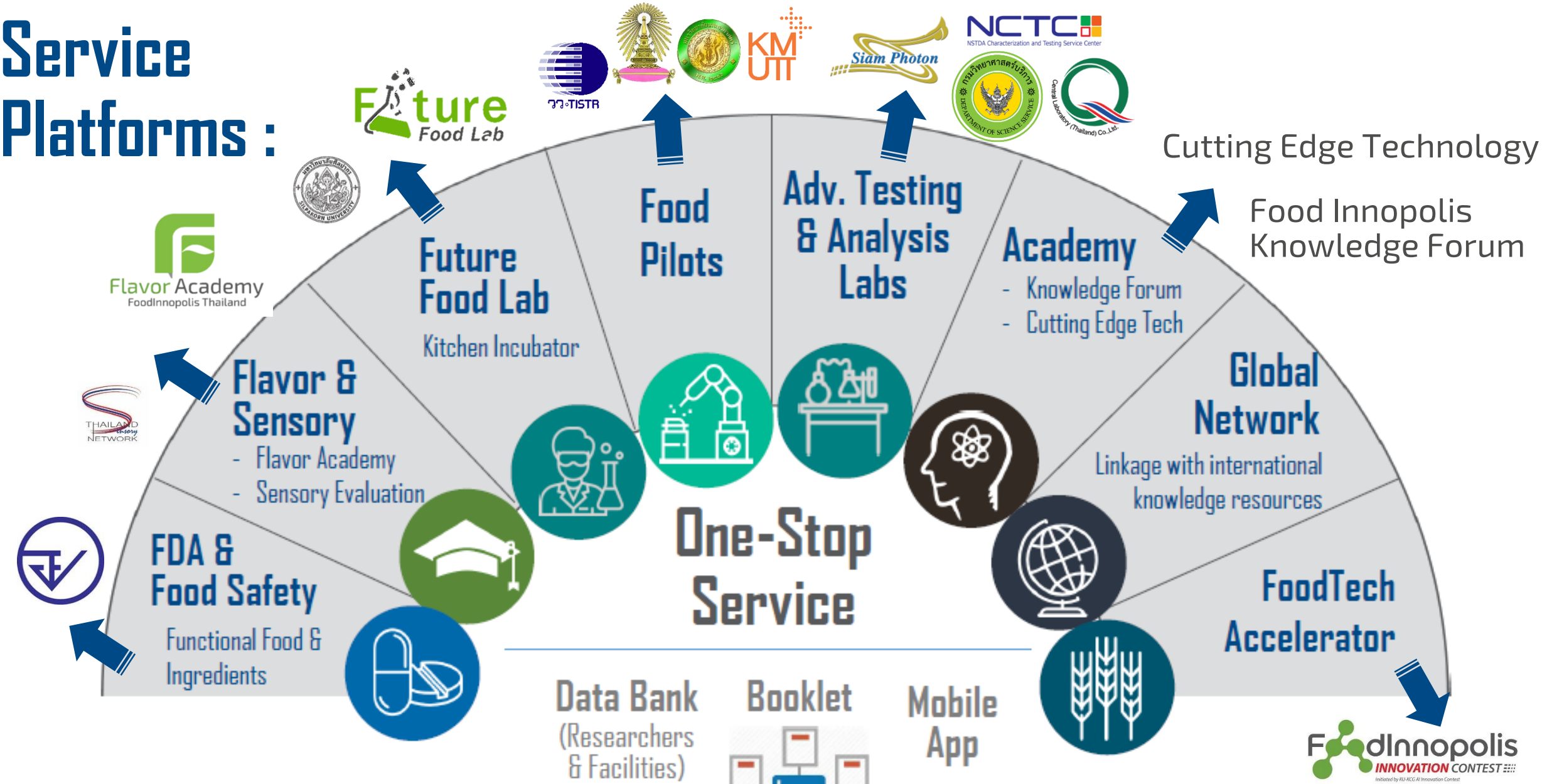
Ready-to-move-in Laboratory

Long-term leased land

33 Tenants in Food Business

(5 Japanese Firms)

Service Platforms :



Cutting Edge Technology

Food Innopolis Knowledge Forum

Ignite : Seed to Scale

IDE Innovation

Future Food Lab

R&D Facilities

R&D Coach

Ingredients & Packaging Library

FoodInnopolis Services & Incentives

- **FoodInnopolis Service Platform**
- Ease of Doing Business with Government
- One-Stop Service for Research, Development and Innovation
- Tax & Non-Tax Incentives, e.g.
  - Corporate Income Tax Exemption
  - 300% Tax Exemption for R&D and Innovation Expenditures
- Others Industrial Policy and Mechanisms for RDI Company

iTAP Innovation and Technology Assistance Program for SMEs

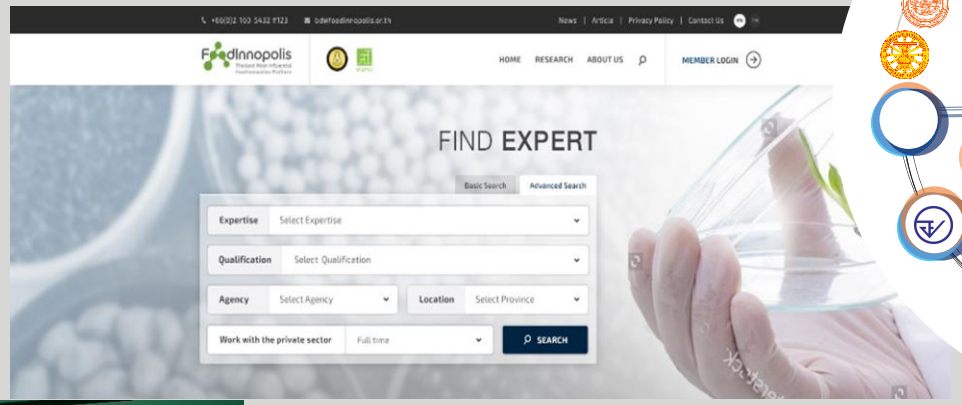
TALENT MOBILITY

Innovation Voucher

Ease of Doing Business for Food Industry

Researchers

Research Development and Innovation



TALENT MOBILITY

Knowledge

Cutting Edge Technology

Knowledge Forum

Equipment/Machine

Standard Testing

Central Laboratory (Thailand) Co.,Ltd.

บริษัท ห้องปฏิบัติการกลาง (ประเทศไทย) จำกัด
CENTRAL LAB THAI

กรมวิทยาศาสตร์บริการ
DEPARTMENT OF SCIENCE SERVICE

SGS

NCTC
NSTDA Characterization and Testing Service Center

วว.TISTR

TÜV SÜD

Equipment/Machine

Pilot Plants

Universities

Food Pilot Plant for the Production of Beverages and Processed Fruits

NCTC
NSTDA Characterization and Testing Service Center

Money

1. Incentive

THAILAND BOARD OF INVESTMENT

BOI/BOI++

Tax Incentive 300%

2. Funding

- **The Thailand Research Fund (TRF) : Future Food Industry (FFI)**
- **Agricultural Research Development Agency (ARDA)**
- **National Innovation Agency (NIA)**
- **iTAP**
- **STIM**

3. Loan

Soft Loan

Bangkok Bank

SMBC

Material Sourcing

Seasoning and Flavor

SYNERGY
INSPIRING TASTE™

Givaudan

MANE

J.D.FOOD PRODUCTS CO., LTD.

Functional Ingredient

HOMEY (THAILAND) CO.,LTD.
บริษัทโฮเม่ (ประเทศไทย) จำกัด

JEBSEN & JESSEN

BRENNTAG

INTHACO

Service Locations of Food Innopolis

FoodInnopolis @ Thailand Science Park

FoodInnopolis Master Plan (2016-2020)

- **Food Innopolis Phase 1 @ Thailand Science Park**
  2 Incubators, Pilot Plants, Long-term Leased Land
- **Food Innopolis Phase 2**
  In Bangkok Metropolitan

At Regional Science Parks

- Chiang Mai
- Khon Kaen
- Songkhla

FoodInnopolis Headquarter

Regional Science Park

CMU : Healthy & Functional Food

KKU : Functional Ingredients

PSU : Seafood & Halal Food

FI Phase III

@ Private RDI Center

Thai Union · MITR PHOL GROUP · MK RESTAURANTS · KCG Corporation · cpram

FI Phase II

@ RSP มหาวิทยาลัย และ หน่วยงานรัฐ

CU : FFL, Food Safety, and Dairy Innovation Cluster

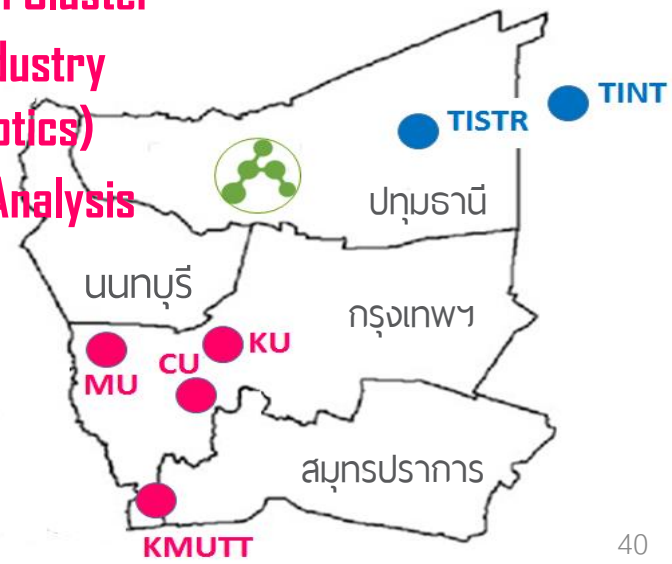
KMUTT : FFL, Food Pilot, and MARs for Food Industry (Mechanization, Automation, and Robotics)

KU : FFL, Food Pilot, and Adv. Testing and Analysis

MU : Nutrition Lab

TISTR : Food Pilot

TINT : Adv. Testing & Analysis



FI Phase I

@ อุทยานวิทยาศาสตร์ประเทศไทย

เชิญชวนให้ Contract Research Organization (CRO) ระดับโลก ด้านอาหารมาจัดตั้งหน่วยบริการวิจัยในพื้นที่ Food Innopolis เช่น ...

- Camden BRI, UK
- Fraunhofer Institute, Germany
- TNO, Netherlands
- CSIRO, Australia
- National Research Council, Canada

Thailand Institute of Scientific and Technology Research

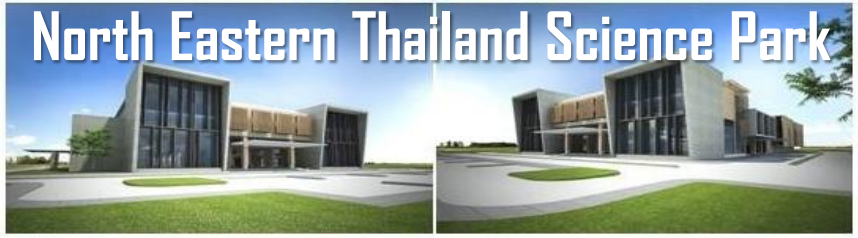
- Food Pilot
- Microbial Resource Center
- Laboratory Animal Facilities

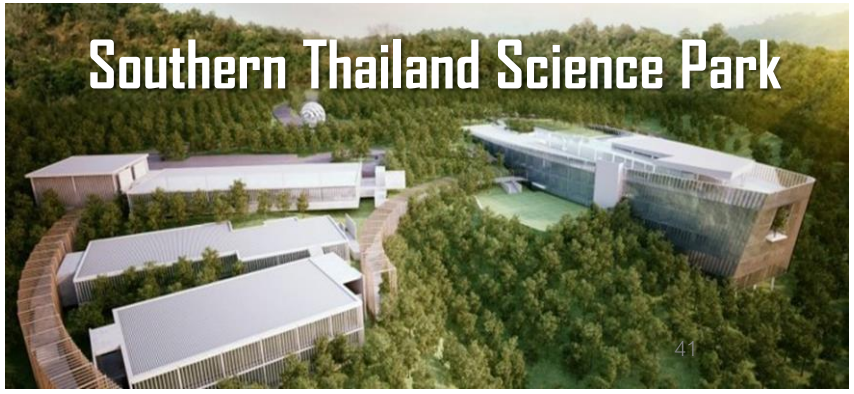
National Institute of Metrology (Thailand)

National Quality Infrastructure : comprises of metrology, standardization, testing and quality management

ASEAN Standard Reference Materials

Organic Chemistry Lab, Inorganic Chemistry Lab, Electrochemical Lab, Gas Analysis Lab, Biological Analysis Lab, Clean Room, Food Safety, Contaminants





SYNCHROTRON
THAILAND
CENTRAL LAB

Apply synchrotron and related technologies into research and innovation for food industry

Thank You

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094-340 4333