BRITISH COUNCIL

CEO Rice Oil Academic Partnerships

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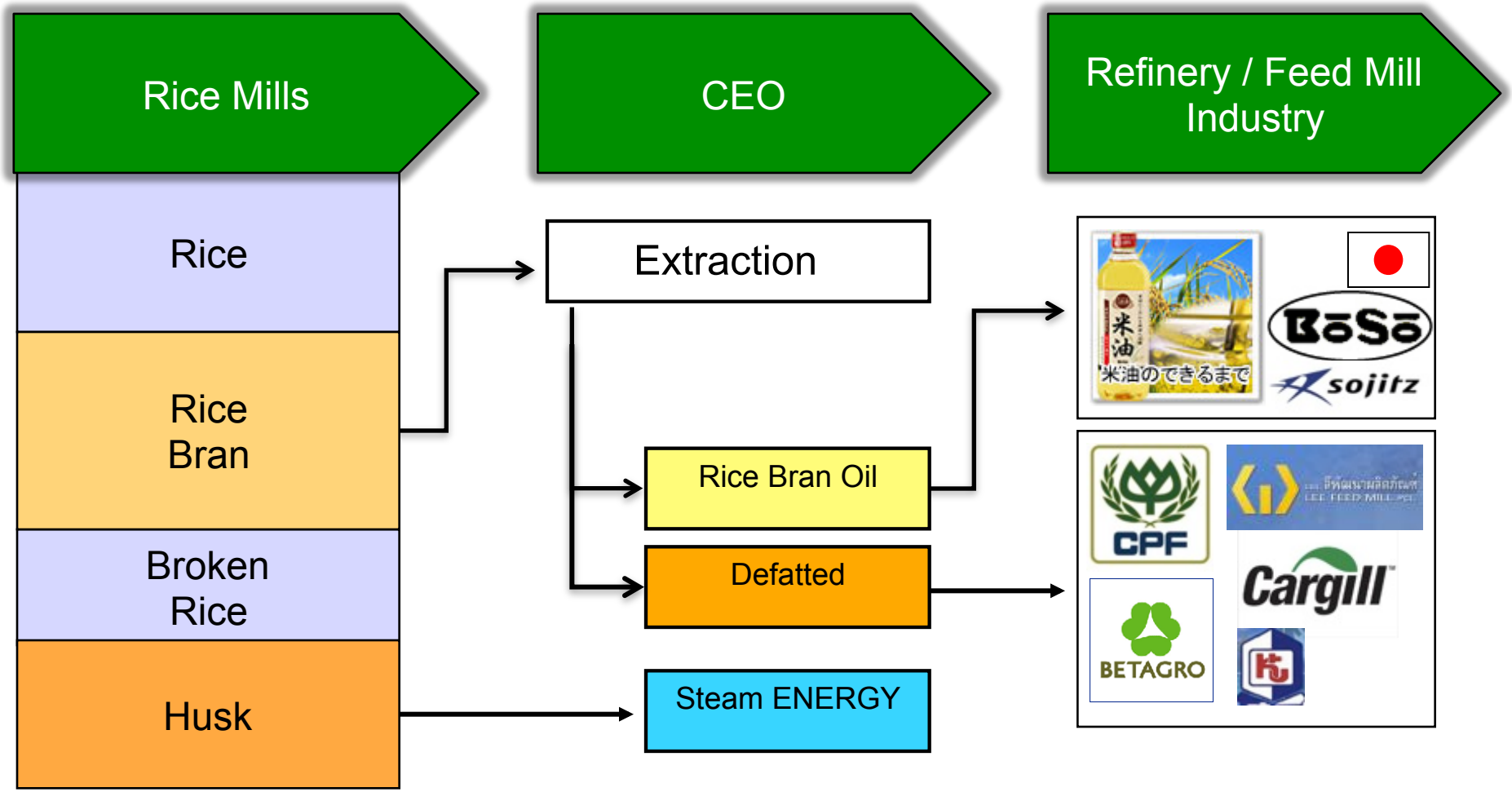
CEO ADDS VALUE TO THAI RICE INDUSTRY FOR EXPORTS

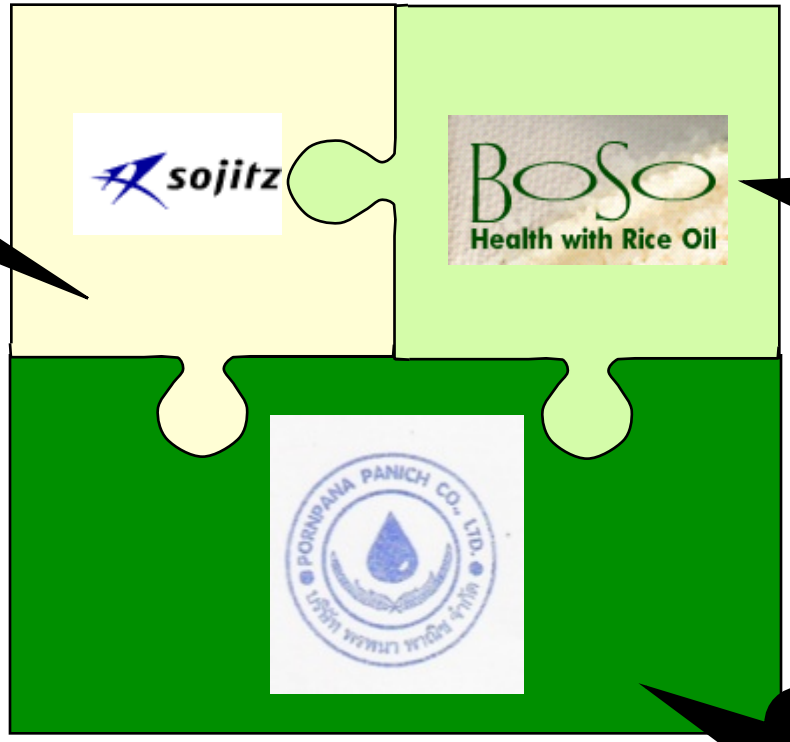
Rice Bran Oil value chain



COMPETITIVE ADVANTAGE ARISES FROM 3 PARTNERS

CEO Partnership

- Trading
- Logistics
- Marketing
- Access to world



- Customer (refinery)
- New Technology

- Local management
- Leadership
- Operation
- Finance
- HR

MORE VITAMINS & ANTIOXIDANTS THAN OTHER OIL

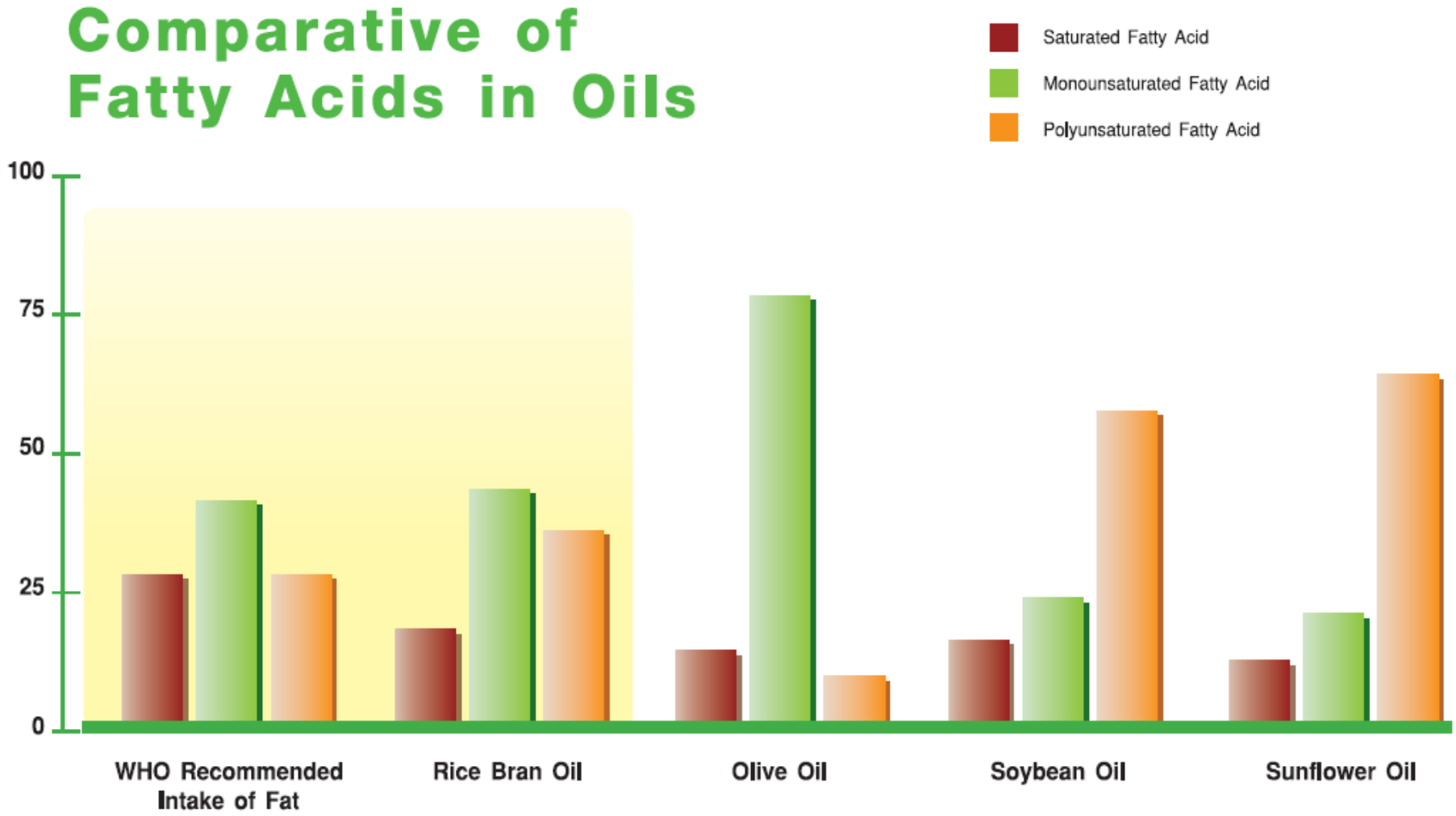
Comparison of natural antioxidants in edible oils

Oil Type	Vitamin E Tocopherol (ppm*)	Vitamin E Tocotrienol (ppm*)	Oryzanol (ppm*)	Total Natural Antioxidants (ppm*)
Rice Bran Oil	81	336	2,000	2,417
Olive	51	0	0	51
Canola	650	0	0	650
Peanut	487	0	0	487
Soybean	1,000	0	0	1.000
Grape seed	256	149	0	405

50 TIMES MORE THAN OLIVE OIL

Source: American Heart Association

MOST “BALANCED” FAT PROFILE RECOMMENDED BY WHO



Source: World Health Organization

…RESULTED IN INDUSTRY APPLICATION GROWTH

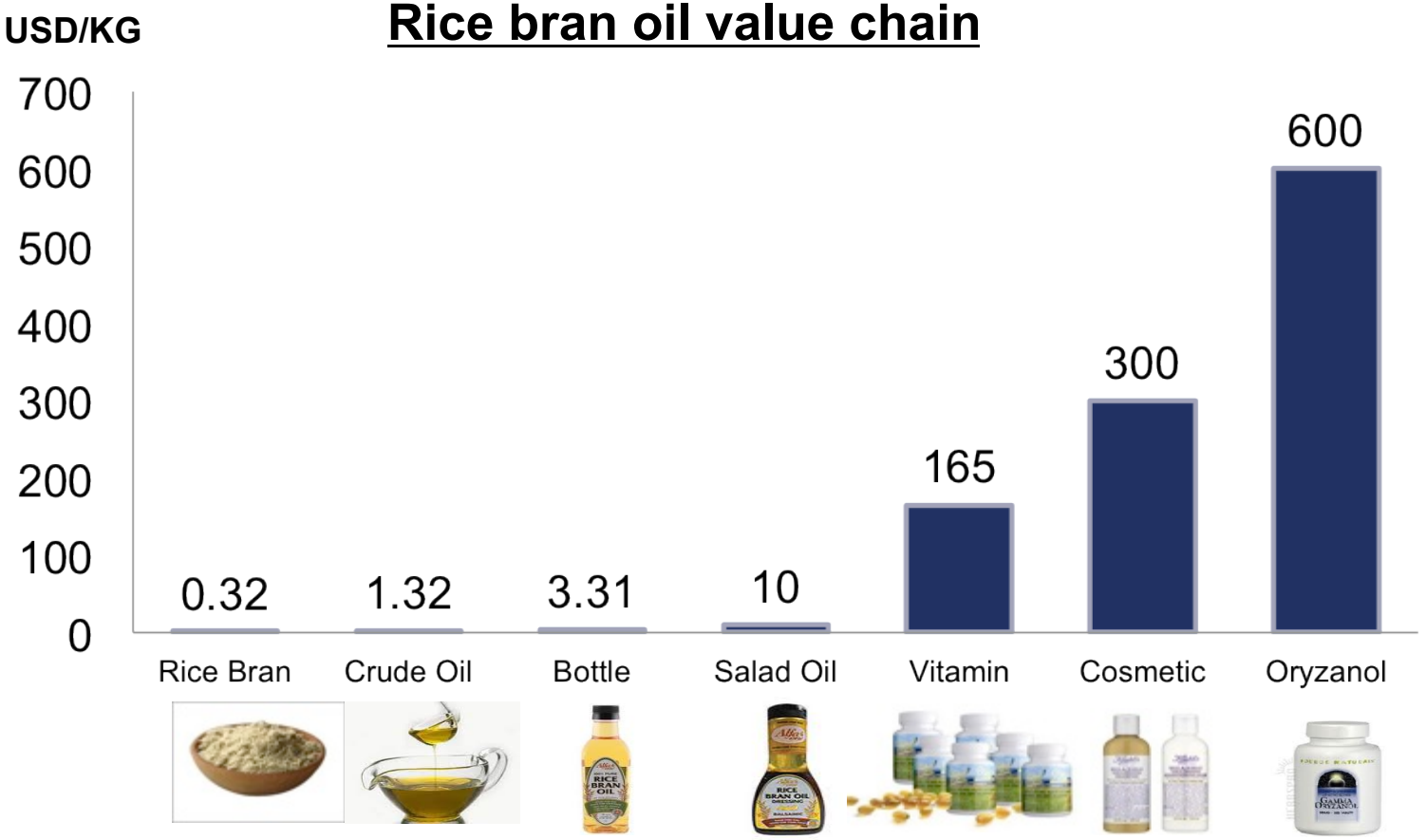
Domestic market has high growth potential

International market larger and growing

Source: CEO Agrifood Research

FUTURE VALUE CHAIN FOR FURTHER EXTENSION

Rice bran oil value chain



Source: CEO Agrifood Research

VAST POTENTIAL OF RICE BRAN OIL AS BIODIESEL

Biodiesel from Rice Bran Oil

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Abstract

Biodiesel is a renewable, biodegradable and nontoxic fuel for diesel engines. It is derived from oils and fats by transesterification with alcohols. As alternative fuel biodiesel has attracted considerable attention during the past decades. The main hurdle to the commercialization of biodiesel is the cost of raw materials. Use of edible oils as biodiesel feedstock cost about 60-70% of raw material cost. Nonedible, inexpensive, low-grade high free fatty acid rice bran oil as raw material, continuous transesterification process and recovery and purification of bioactive compounds from biodiesel by-product are primary options to be considered to lower the cost of biodiesel. Acid-catalyzed or lipase catalyzed transesterification are the two most suitable methods to produce biodiesel from high fatty acid rice bran oil. Continuous process for the production of biodiesel from rice bran oil containing different FFA contents and purification and isolation of bioactive compounds from biodiesel residue are currently under investigation in this institute.

Key words: Biodiesel ; Rice bran oil; Transesterification, lipase, bioactive compounds

1. Introduction

1.1 Background

Rice is one of the oldest cereal grains and staple diet for two-third of the world's population. Rice

RICE BRAN OIL BIODIESEL AS AN ADDITIVE IN DIESEL- ETHANOL BLENDS FOR DIESEL ENGINES

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ABSTRACT

A number of studies currently focus on the renewable fuels to reduce the reliance on petroleum fuels. Biofuels such as biodiesel and bioethanol have been studied and tested in many countries including India. One of the methods to reduce the use of fossil fuel is blending ethanol with fossil diesel. However, an emulsifier or a co-solvent is needed to homogenize the diesel-ethanol blends. The rice bran oil biodiesel offers an alternative application as an emulsifier for diesel and ethanol blends. The present research is aimed to investigate experimentally the performance and

Source: CEO Agrifood Research

9 PARTNERSHIPS WITH UNIVERSITIES NATIONWIDE

Chiangmai U
Oil-blended

Naraesuan U.
Non-dairy creamer
Rice bran protein
Gamma-oryzanol extraction
Product development

Pibulsongkram Rajabhat U
Non-dairy creamer

Khonkaen U
Rice bran protein

Phetchaburi Rajabhat U
Non-dairy creamer

Chulalongkorn U.
Rice bran protein
Biodiesel

Songkla U
Rice bran protein

Kasetsart Uni
Oil extraction

Mahidol U
Efficacy of rice bran oil

Source: CEO R&D

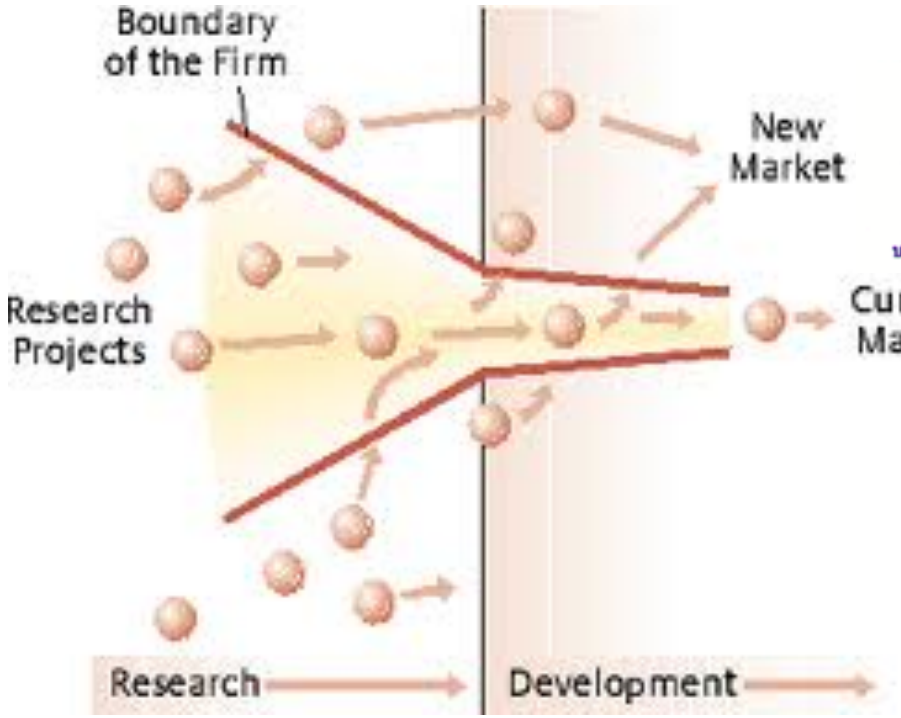
9 PARTNERSHIPS WITH UNIVERSITIES NATIONWIDE

Dimension	Interactions: Prof - Mgt	Interactions: Prof - Empl	Interactions: Student - CEO
Product Development	• Brainstorming • Feasibility	• Knowledge transfer • Training	• Scholarship • Internship
Efficacy test	• Parameter setting • Compliance	• Cooperation • Advisory	• Scholarship • Internship
Process improvement	• Benchmarking	• Implementation • Monitoring	• Scholarship • Internship

EDUCATION – SME INDUSTRY CHALLENGES

Innovation pipeline

- Lack of resources
- Lab scale phase



- Prototyping
- Commercialization

Successful lab research can not be turned into prototyping and commercialization due to lack of resources from both ends

Source : Innovation framework, MIT review

CLUSTER APPROACH REQUIRED FOR INNOVATION

Academics

Publics

Privates