Creating new ecosystems for BrainHealth

a case study of MBI Platform

ImPACT Program
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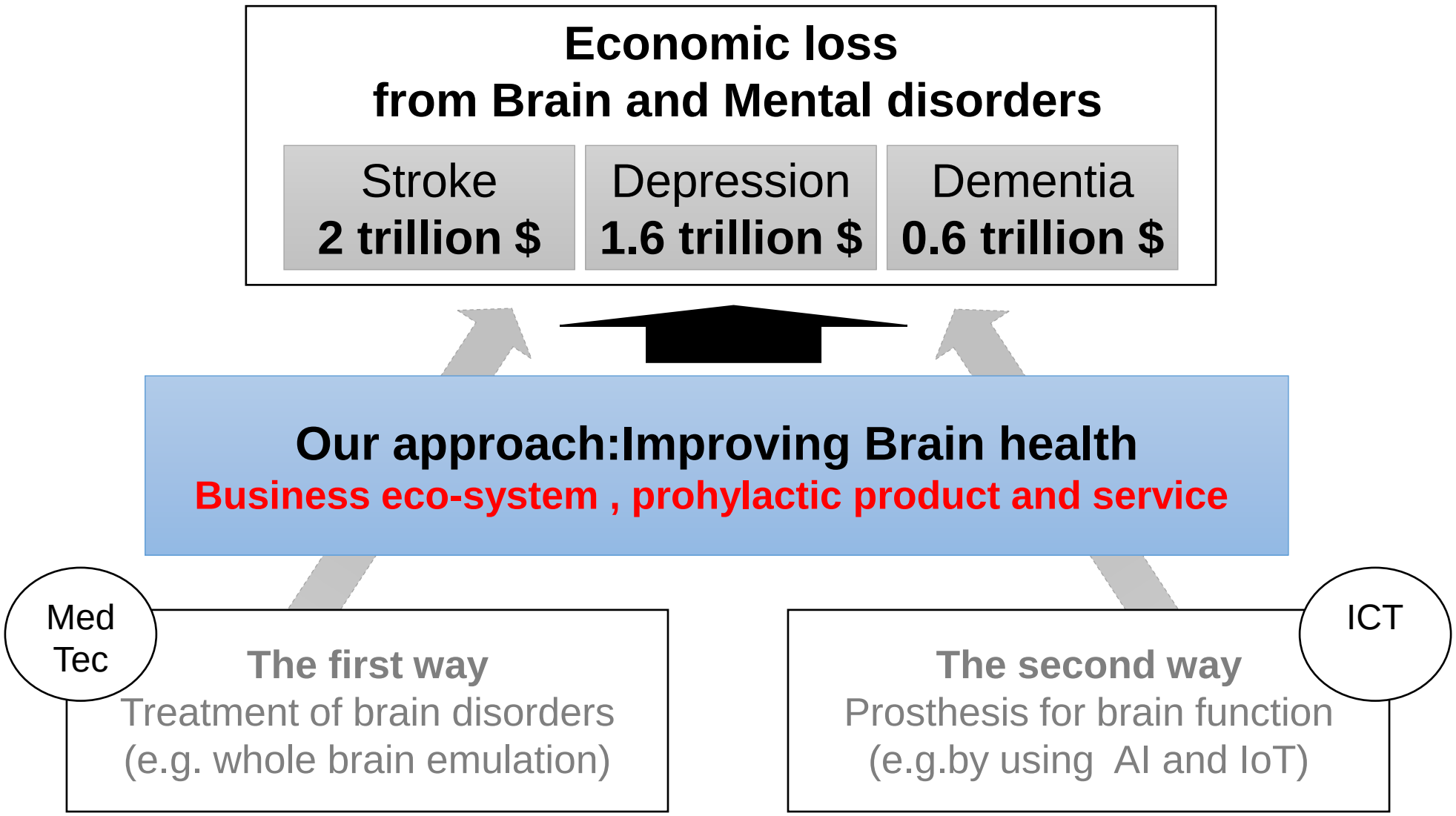
Background and approach



Aiming at industrialisation: Fields of study

Parallel efforts in 3 fields aim at the creation of a brain health industry
Some concrete examples

Field	Scope	Roles
Service	Specific brain health product or service	Service Developer Service Manager
Organisation	Branded brain health products or services	Business Development Manager Customer Relationship Manager
Industry	Brain health care in general	General Management Policymakers

Service Field

Organisational Field

Industry Field

Current efforts in the service field

Value co-creation in services

- Shifting from the exchange value of products to the co-creation of use-value in services
- Sharing the service experience of users is important for providers to create value

Value co-creation in Brain Health Businesses

- Service experience: From purchase of service to realisation of effects
- Approach：Developing brain health indicators for measuring of effects that can be commonly understood by users and providers

Our efforts

Developing brain health indicators based on knowledge from brain science
Testing of indicators based on empirical data

Development of Brain Health Indicators

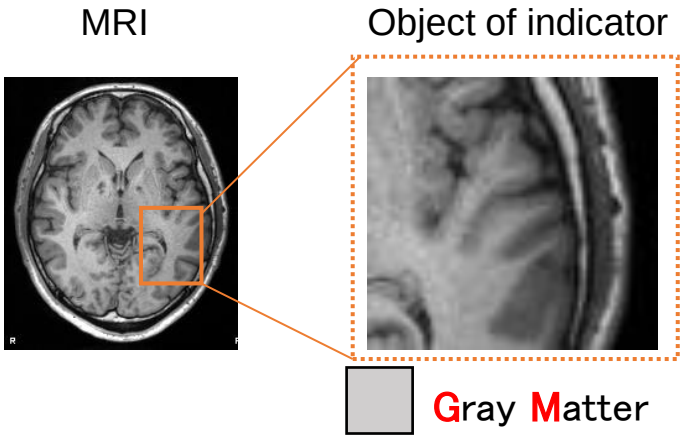
BHQ (Brain Health Quotient)

Using insights from brain science for building an indicators that allow for qantitatively assessing brain health status

GM-BHQ (Gray Matter Volume)

- Builds on gray matter rich in neuronal cells
- Indicator represents distributional properties of neuronal cells

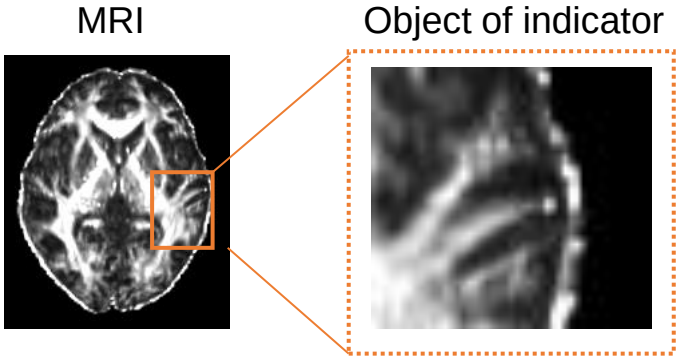
  ⇒Signifies brain capacity of a variety of learnings



FA-BHQ (Fractional Anisotropy)

- Builds on white matter, i.e., fibers that are connecting brain areas
- Indicator represents cohesional properties of neuronal fibers

  ⇒Signifies the efficiency of information transmission



Testing indicators: Assessing dementia via GM-BHQ

Diagnosing progression of dementia

Diagnosis by results in test of cognitive capabilities

MMSE
(Mini-Mental State Examination)

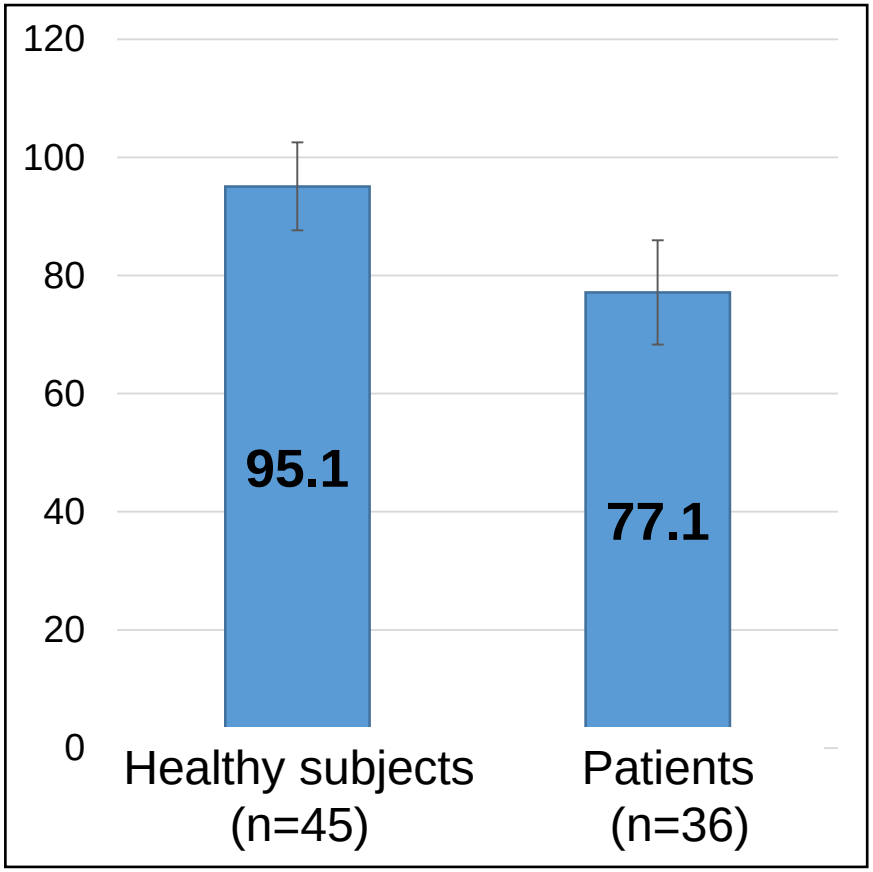
Orientation
What is the (year) (season) (date) (day) (month)?
Where are we (state) (country) (town) (hospital) (floor)?

Registration
Name 3 objects: 1 second to say each. Then ask the patient
all 3 after you have said them. Give 1 point for each correct answer.
Then repeat them until he/she learns all 3. Count trials and record.
Trials _____

⋮

Diagnosing current general status

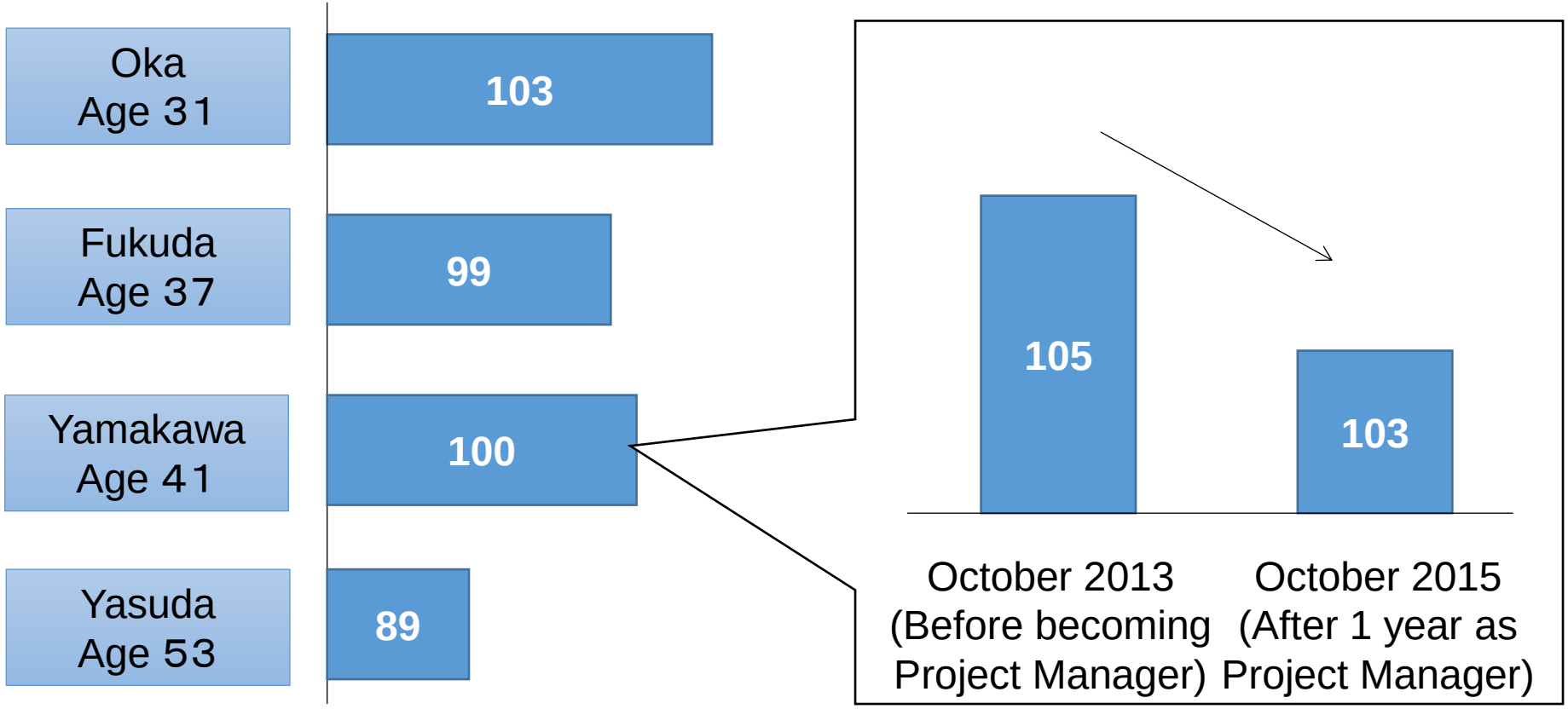
Diagnostic possibilities
based on brain analysis



(Analysis based on data provided by Shimane University

Experiencing Brain Health via BHQ

GM-BHQ of our team members



Indicators enable the provision of individual characteristics and lifestyle-induced change in brain health status in terms of a “personal experience”-service

Service Field

Organisational Field

Industry Field

Current efforts in the organisational field

Platforms in organisational theory

- From producer-led vertically integrated organisations to co-creation enabling platform-type organisations
- Integrating a basic layer with a value-enhancing layer into one single organisation is key

Building a platform for Brain Health

- Universal value proposition: BHQ as an interface shared with users
- New value provision: Various value-creation modules aimed at developing and transforming BHQ

Our efforts

Standardisation of an IT platform for exchanging brain information
Development of services using various brain and health data

Standardisation aimed at sharing brain information:

~ITU-T SG16/Q28 Multimedia Brain information Platform~

Monitoring health status of brain

Persons who want to know their brain status

Managing health status of brain

Persons having requests for brain healthcare

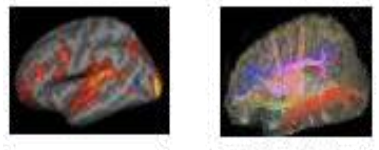
MBI-PF :common base for Brain data sharing

Access	Exchange	Browse/Edit
- ID management - Permission control	- Interface - Transport protocol	- Data format - Metadata

MRI scanning centers

Analysis of MRI images

Solution developers

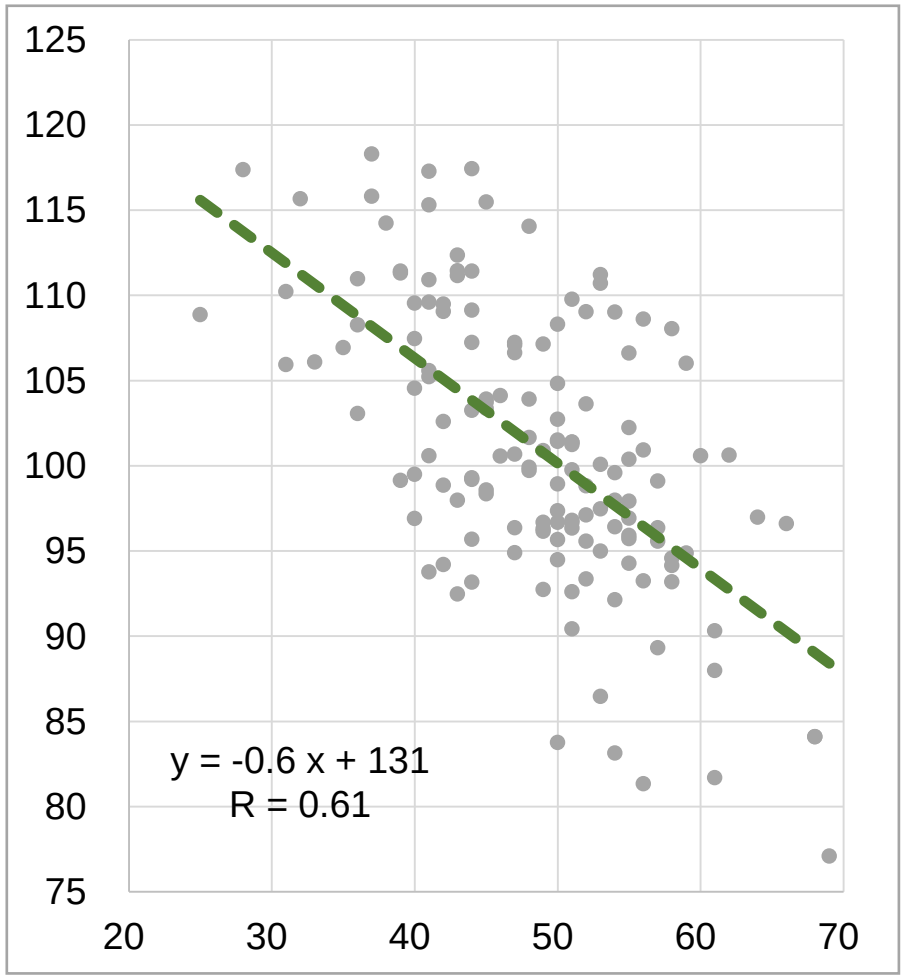


solution-assessing

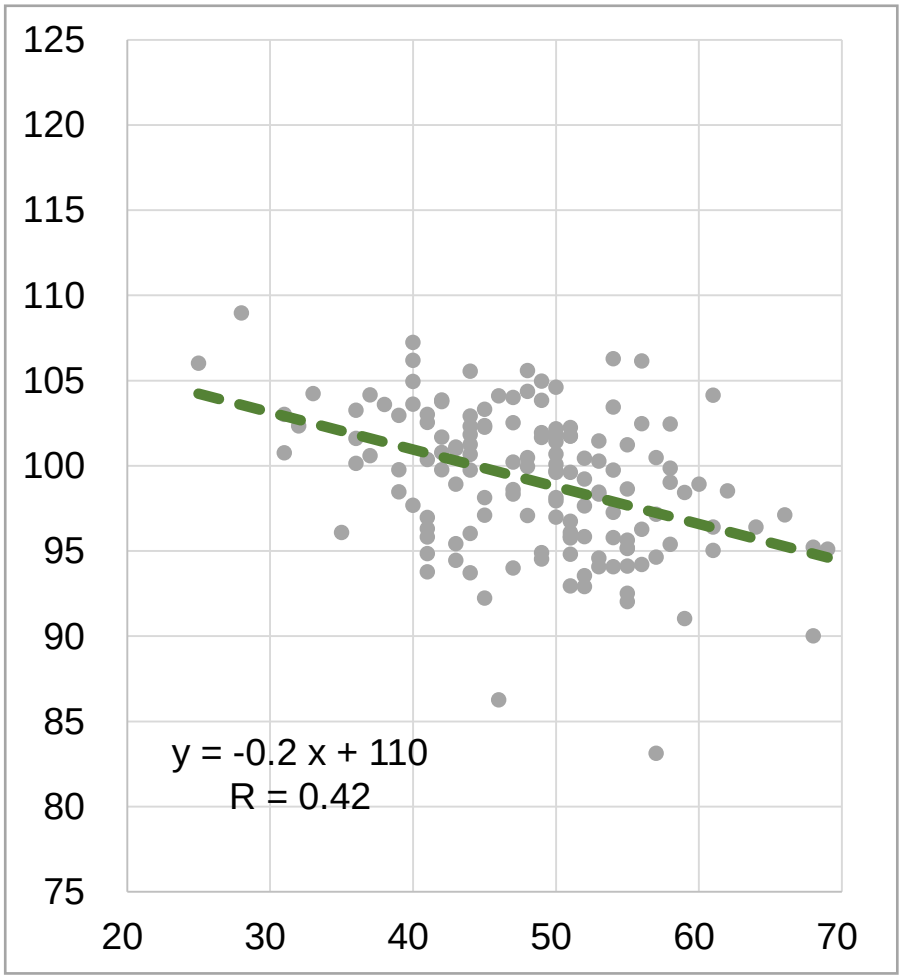
Relationship between brain index (BHQ) and age

As BHQ obviously decreases with age, we assess BHQ suitability for assessing brain juvenility.

GM-BHQ and age



FA-BHQ and age



Find solutions to increase these BHQ slope

Service example of BHQ in use: Estimating brain age

Oka, age 31		Yamakawa, age 42	
GM-BHQ 103	FA-BHQ 110	GM-BHQ 100	FA-BHQ 104

Judging from the scores only, Oka's BHQ is higher, but...

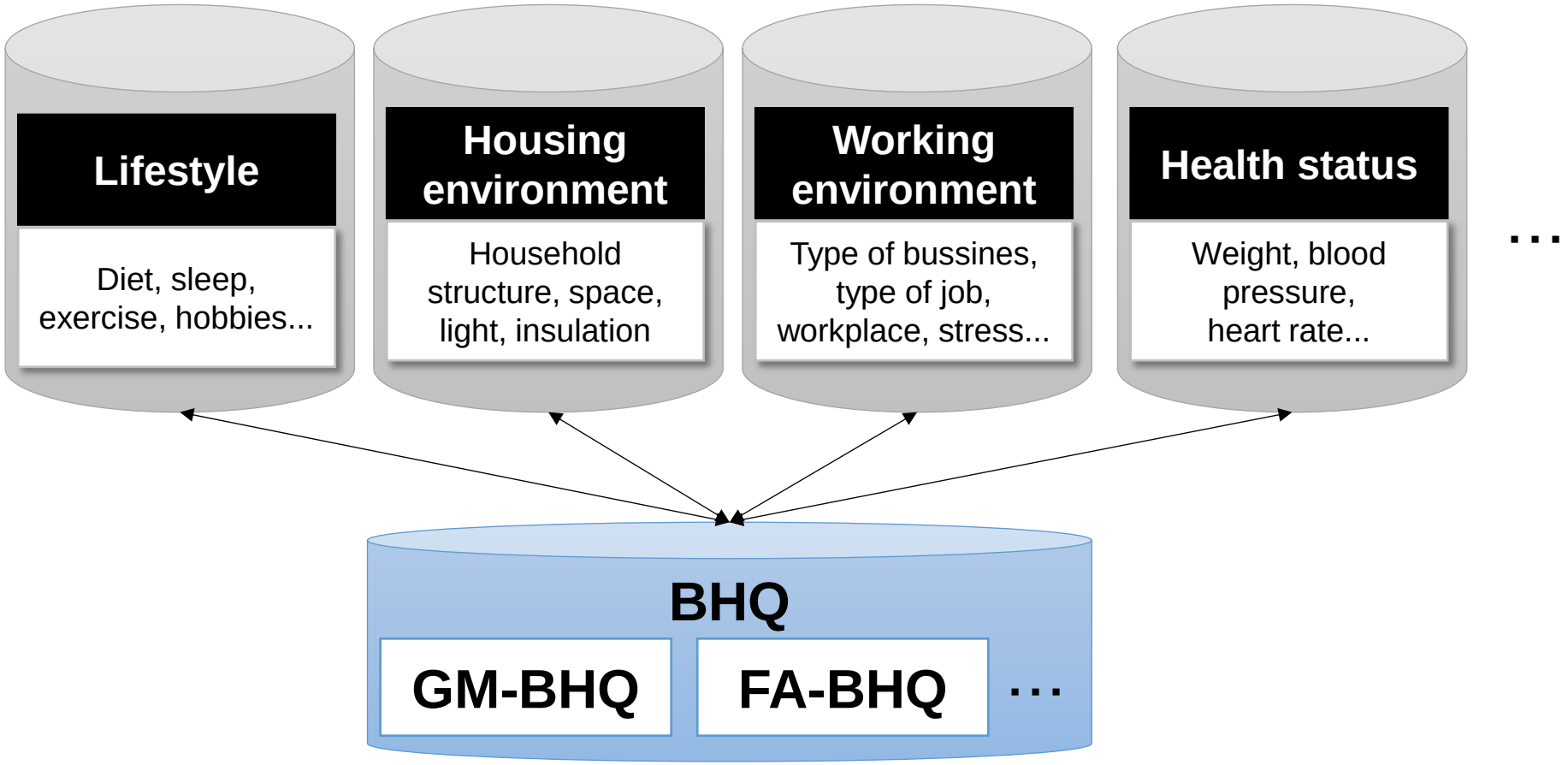
Calculating brain age from BHQ

Brain age: 47	Brain age: 40	Brain age: 49	Brain age: 45
(+16 years)	(+9 years)	(+7 years)	(+4 years)

Compared to actual age, Oka's brain age equivalent is much higher!

Calculating a brain age equivalent based on BHQ,
it becomes easy to grasp the state of one's brain health.

Exploring various brain health solutions

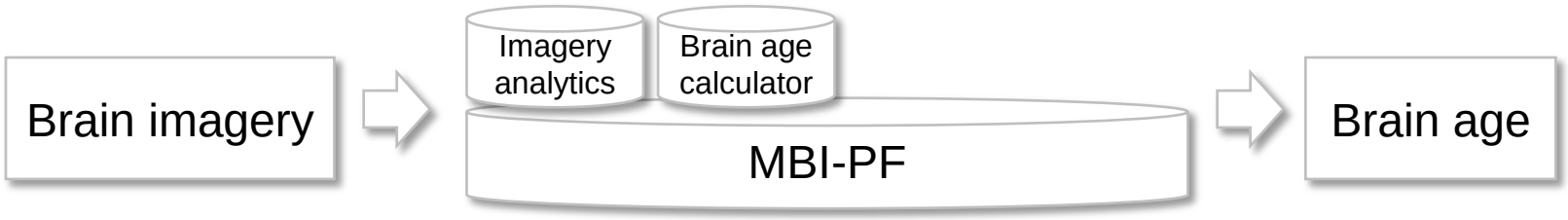


By exploring the relationship between a wide variety of data and BHQ, we aim at the identification of brain friendly lifestyles and solutions

Potential for various use-cases

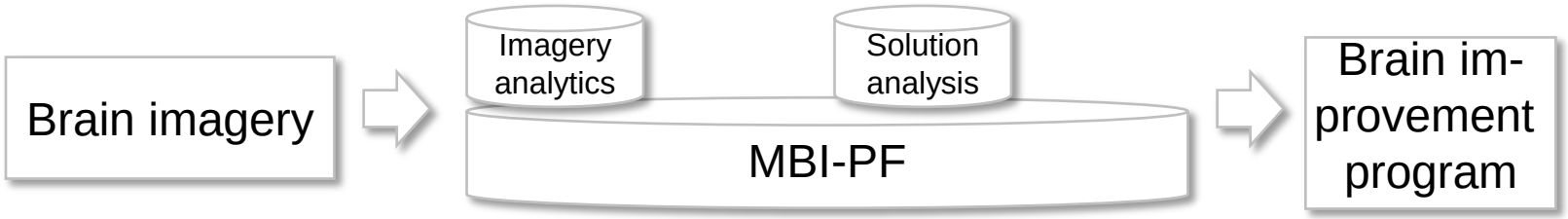
Applications

Calculating brain age



Brain health

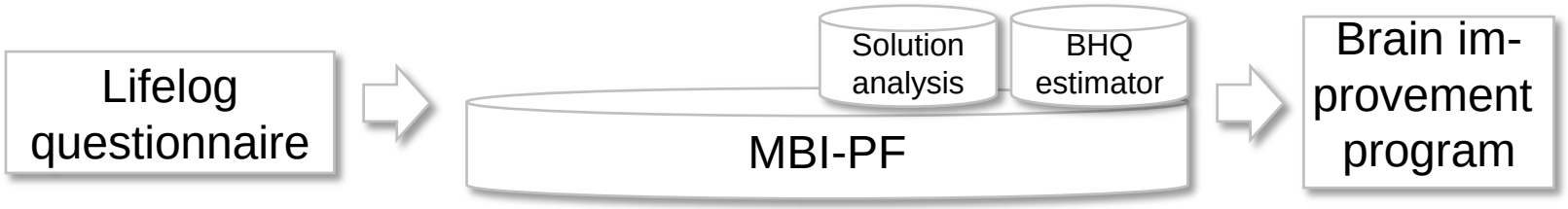
Providing solutions（Lifestyle improvements, recommended products, etc.）



ehealth

Estimating indicators without brain imagery

Providing solutions based on estimated indicators



UHC

Going forward MBI-PF shall be made open access in order to maximise use cases via the linking in of all kinds of data.

Service Field

Organisational Field

Industry Field

Current efforts in the industrial field

Industrial Eco-System

- From inter-firm competition to a business eco-system originating from inter-firm cooperation via open platforms
- Integrating various players into a network is key (adding a competitive to a complementary relationship)

Building the Brain Health Business Eco-System

- Relationship: between ImPACT as the driving force behind BHQ standardisation and private business as BHQ users
- Incentives at participation: making available model cases for joint use

Our efforts

Unite businesses from various fields in a standardisation consortium

Set-up a mechanism for collecting new ideas on brain health

Building an eco-system with private businesses: B3C (Brain Business Bridging Consortium)

ImPACT

- MBI-PF (Share BHQ)
- Neurology Assoc. (Obtain MRI data)
- Research Group (Development of model cases)

Business and Academia Consortium (B3C)

IT & Communication companies

NTTソフトウェア, NTT DATA, EPSON, OMRON, RICOH, 構造計画研究所 KOZO KEIKAKU ENGINEERING Inc., Panasonic, TOSHIBA, ATR-Promotions, ADK, TOPPAN, HAKUHODO, NeuroSky, Vstone ヴイストン株式会社

Foods & Consumer goods companies

Asahi, KIRIN, SUNTORY, SAPPORO, meiji, TEIJIN, SHISEIDO, KOKUYO ひらめき・はかどり・ここちよさ, AEAJ Aroma Environment Association of Japan, 東海光学株式会社, CARMATE

Social Infrastructure companies

NISSAN, DENSO, YAMAHA, Calsonic Kansei Driven by Inspiration and Innovation, TAKENAKA, Fujikura, 野村不動産, SEKISUI HOUSE, エネルギー・フロンティア TOKYO GAS

We are building the brain health eco-system by uniting MRI examination centers, research institutions developing on model cases, and a broad variety of businesses.

Open efforts targeting brain health: Brain Health Challenge

Review of proposals
CfP for products or services linked to brain health

Selection criteria
- Originality of concept
- Brain scientific relevance
- Practical applicability

Prize decisions & examination
Examination of winner entries by brain imagery

MRI imagery of about 100 subjects

Product A
Product B
Service α
…
…

MRI imagery of about 100 subjects

Review announcement
Award ceremony for products and services with positive effects on brain health

Wrap-up

BHQ enables “open science”

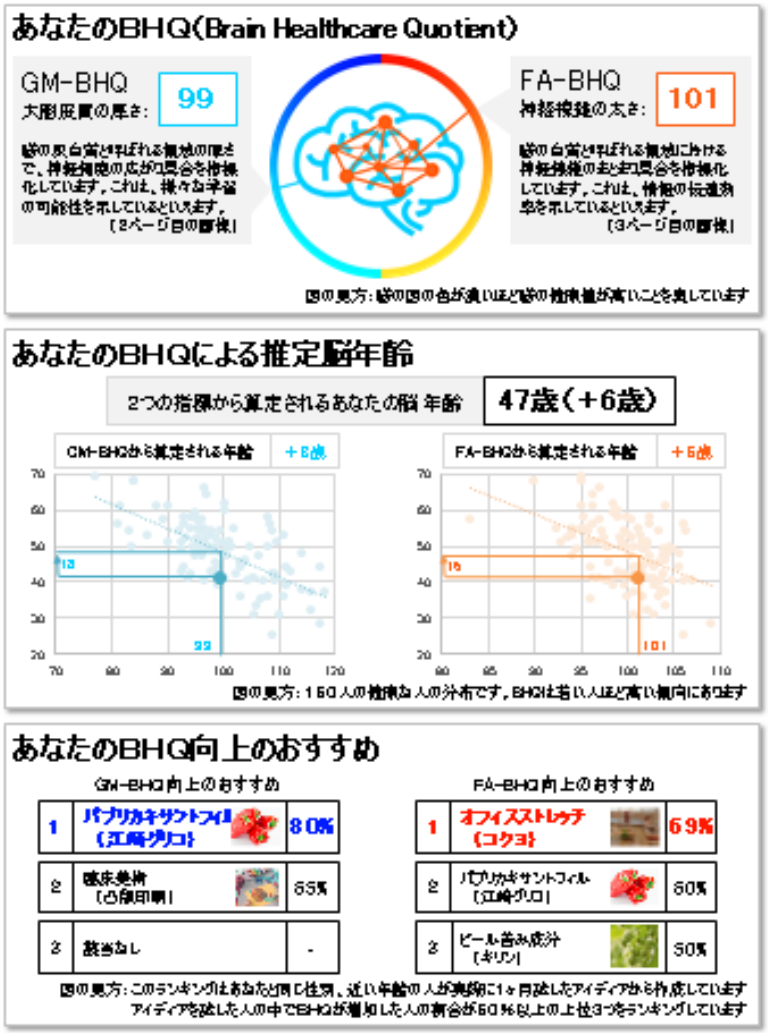
State of efforts at industrialisation

Service field
Indicator-based value co-creation
（BHQ）

Organisational field
Providing various value experiences
（Brain age estimation）

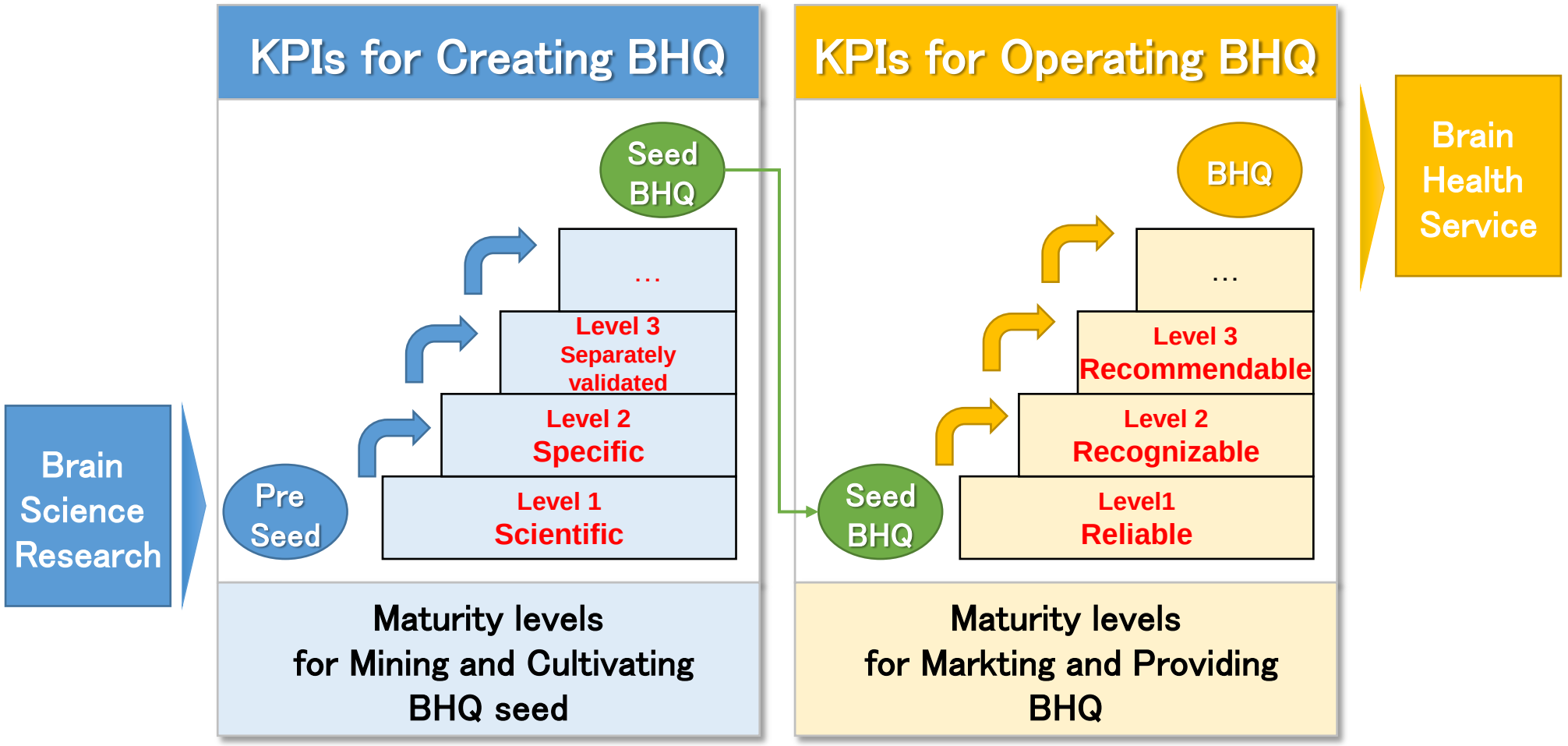
Industrial field
Exploring prophylactic methods
（Business challenge）

Consumer Service Development



Each and every users may act as researcher by obtaining his or her BHQ and by contributing ideas and experimental results for further testing by the community.

New workitem proposal @ ITU Q28/16
KPIs and protocols for establishing Brain Healthcare Quotients in MBI-PF



KPIs for creating a brain health industry

Building KPIs based on BHQ usage we aspire to boost its popularisation

	Developing BHQ（3S）	Exploiting BHQ（3R）
Value co-creation	【Scientific】 Indicator builds on strong neuro-scientific foundations	【Reliable】 Rely on scientific testing that general public users can trust
Platform	【Specific】 Indicator is directly linked to concrete health variables	【Recognizable】 Provide easy-to-understand concepts for general public users
Eco-System	【Separately/serially validated】 Indicator has been tested in dif-ferent places an various domains	【Recommendable】 Enable users to suggest use of service beyond original domains


ImPACT


rain
usiness
ridging