HITACHI
Inspire the Next

Fostering Business Growth with AI

AI for Happiness of People

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Changes We Face Now

	20th Century		21st Century
Demand	Basic infrastructure for life & society	→	Diversified & changing needs
Supply	Mass production & mass marketing	→	Customization for individual situations
Profit from	Standardized rule for repeated deployment	→	Flexible learning & adaptation
Result	1st productivity revolution Larger middle layer & environmental load	→	2nd productivity revolution Recovery of middle-layer & environment

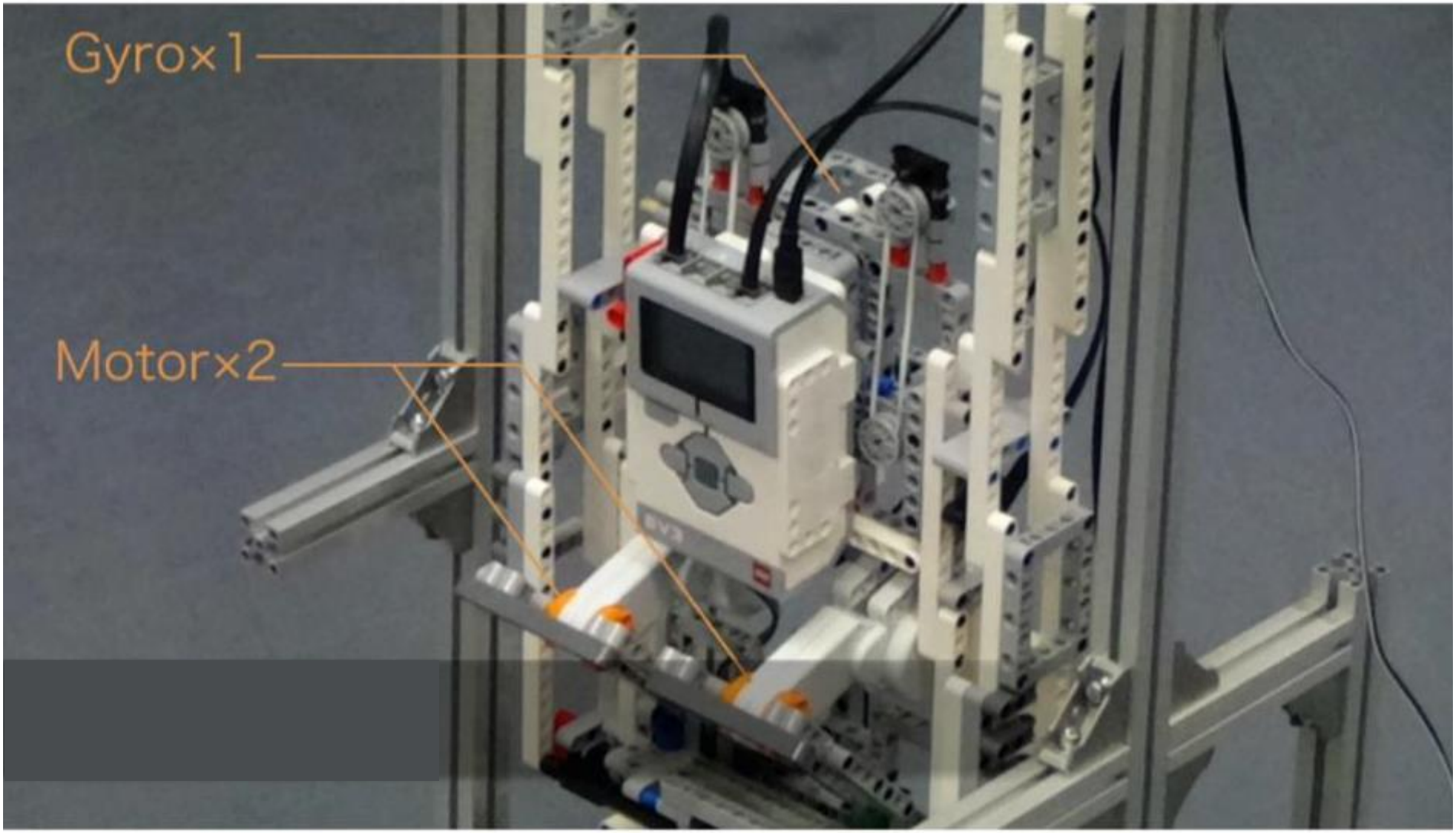
How We Face
Changes & Diversity

From Standardize & Deploy to

Experiment & Learn

AI as an Experiment Site

Demonstration



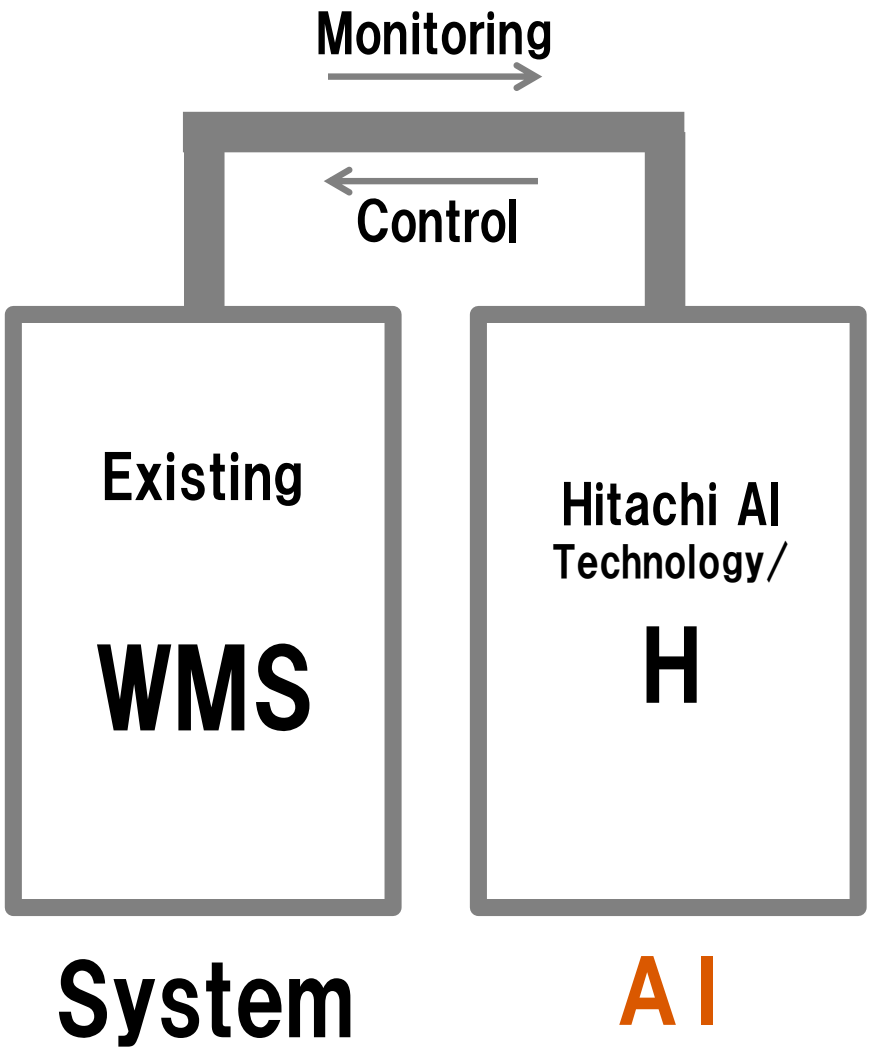
Warehouse

Checking & Packing

Picking

Outcome-Oriented Warehouse System

WMS = Warehouse Management System

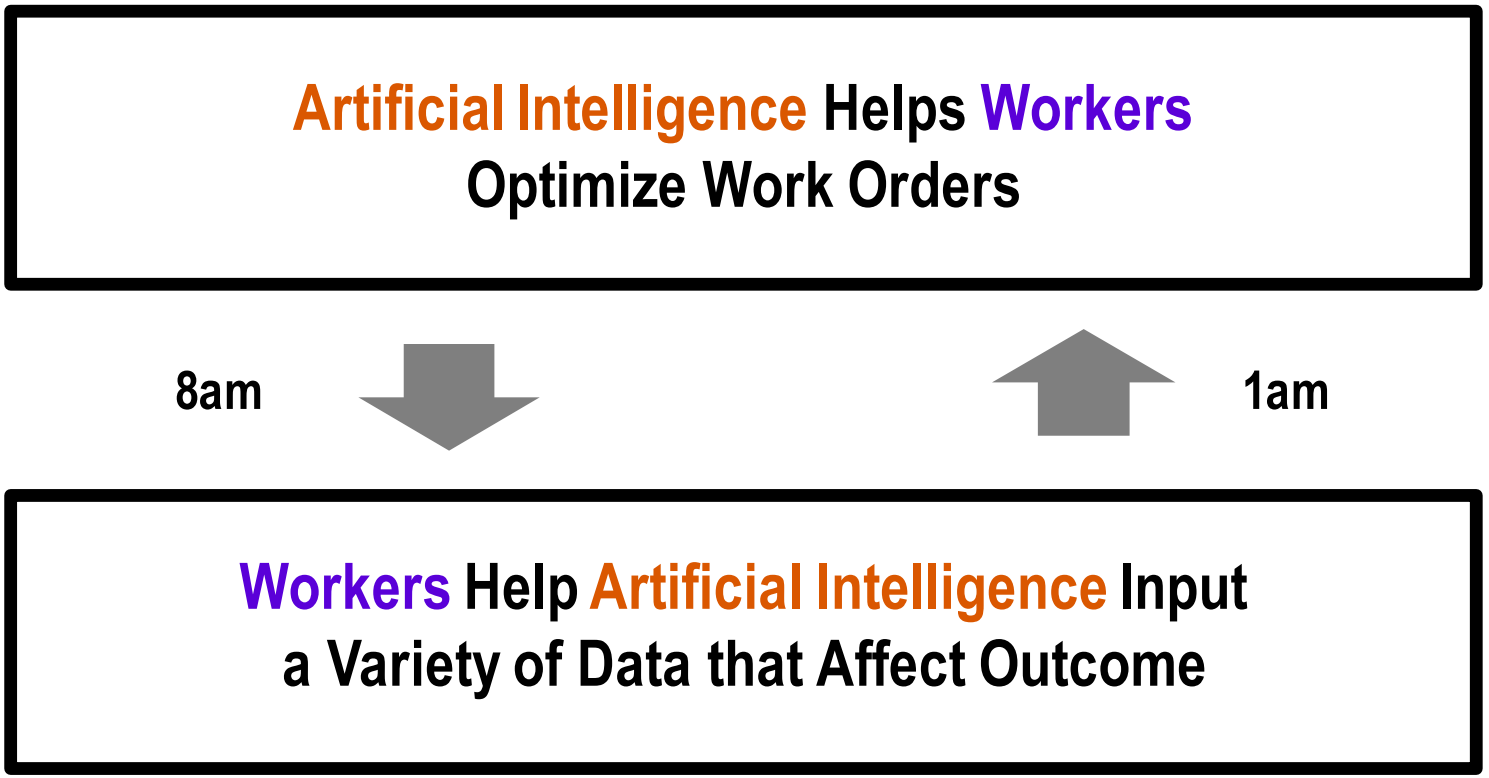


Learns from data, adaptively grows, and provides the results

- ◆1 **Outcome is defined as "total work time"**
- ◆2 **No inputs of warehouse knowledge nor logic**
- ◆3 **Added-on to existing WMS system**

Outcome-Oriented Warehouse Management

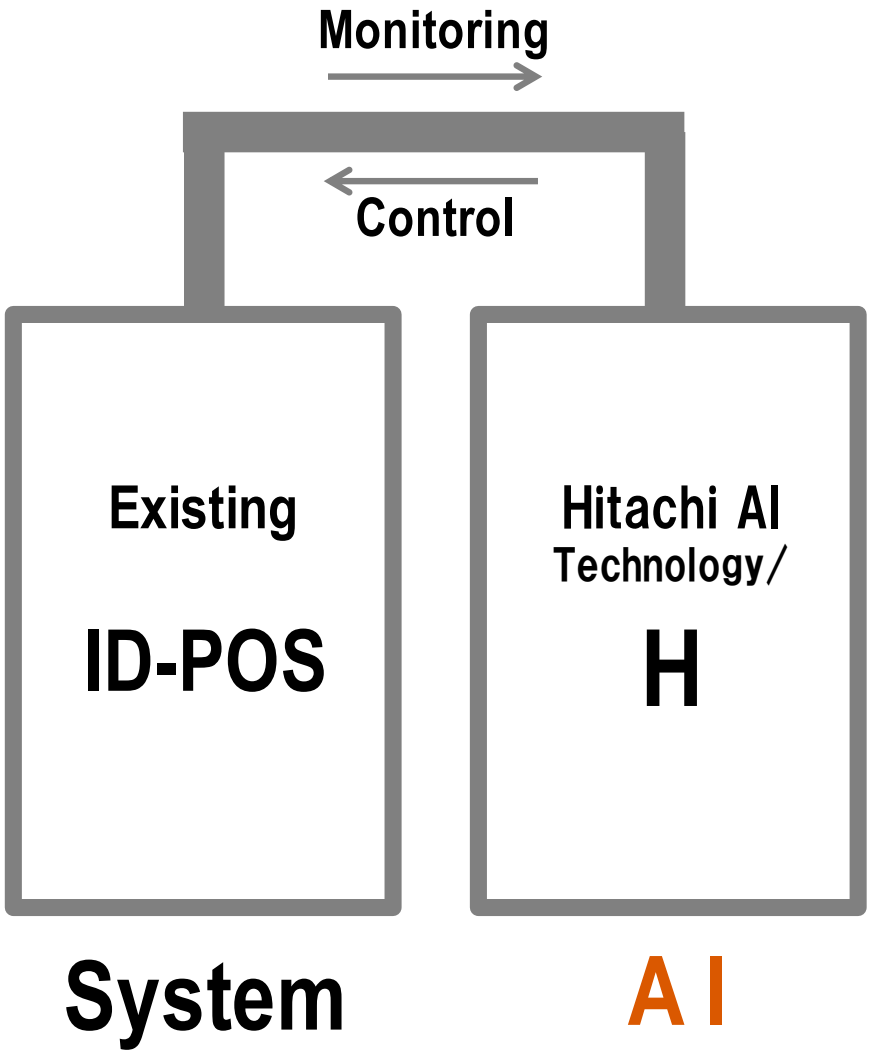
Working & Learning Daily Added on Existing WMS with 8% Productivity Enhancement



Retail-store

Outcome-Oriented Store System

POS = Point of Sales



Learns from data, adaptively grows, and provides the results

- ◆1 Outcome is defined as "sales per customer"
- ◆2 No inputs of store knowledge nor logic
- ◆3 Added-on to existing POS system

Human vs. AI

Rule: Increase customer sales based on 10-day data

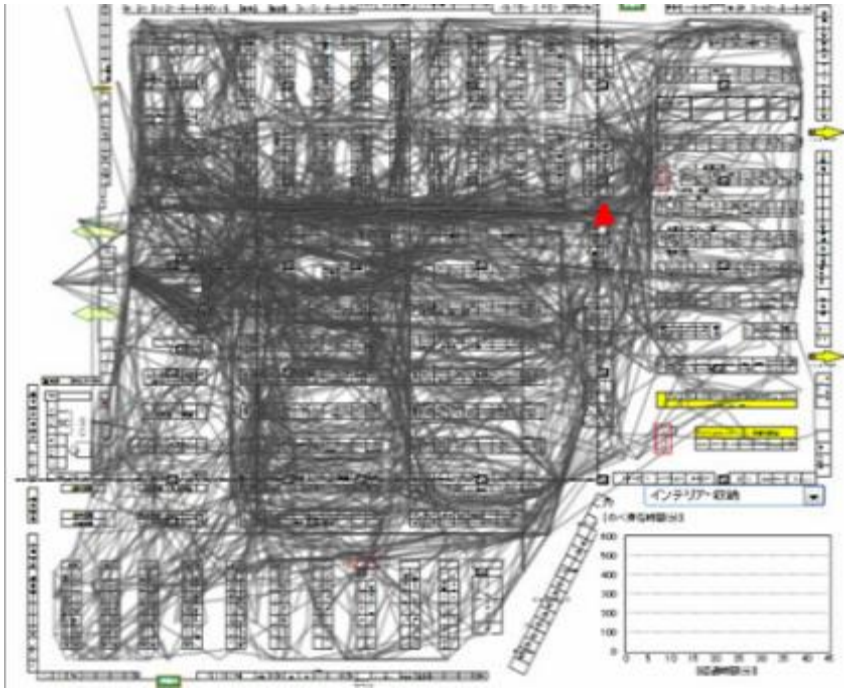
	Retail Specialists (2 persons)	Artificial Intelligence
Approach	Interviews with executive etc Use of domain knowledge	Data only No domain knowledge
Action	POP ads for focus items & item rearrangement	Employee presence at hot spot Identified
Result	No sales increase confirmed	Sales per customer was increased by 15%

Computer with big data enhances business performance

Hot-Spot Employee Presence Enhanced Sales

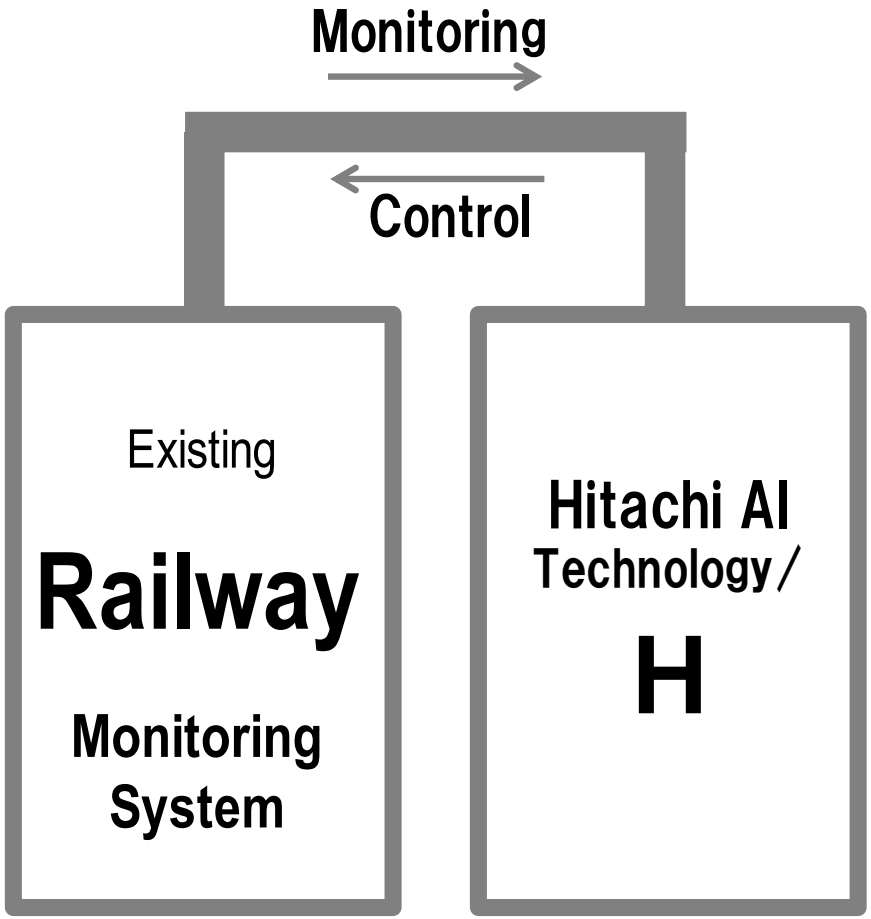
100%

115%



Railway

Outcome-Oriented Railway



Learns from data, adaptively grows, and provides the results

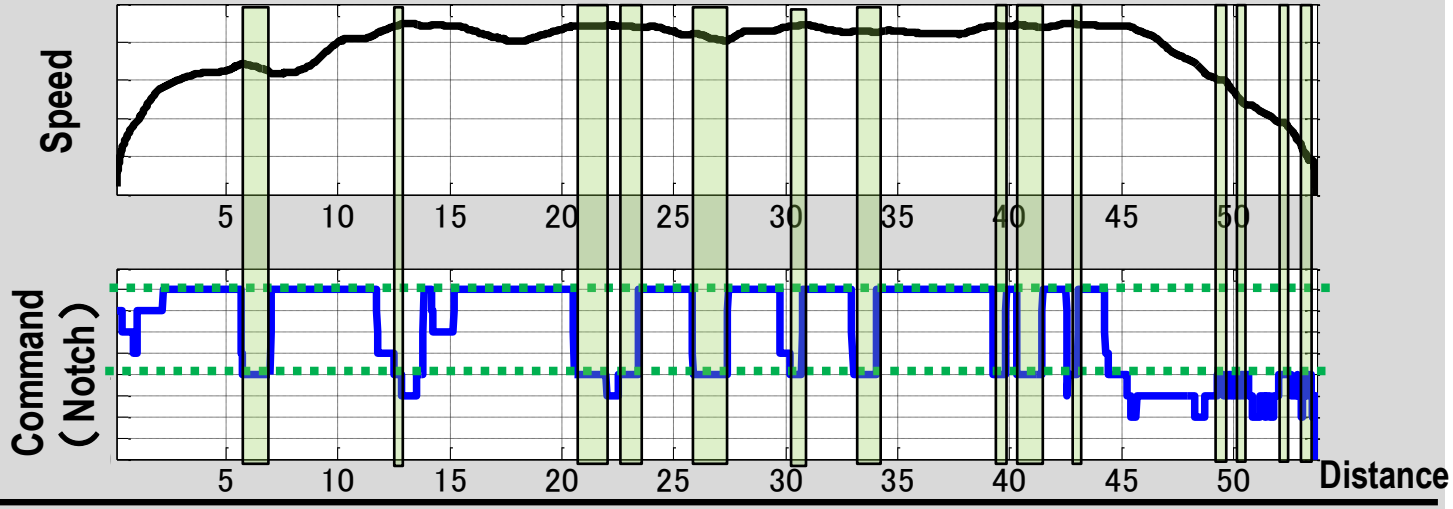
- ◆1 **Outcome is defined as "Reducing Electricity"**
- ◆2 **No inputs of railway knowledge nor logic**
- ◆3 **Added-on to existing monitoring system**

AI Discovers Low-Power Train Operation

Optimized Operation Enables 14% Power Saving (Annual Prospect)

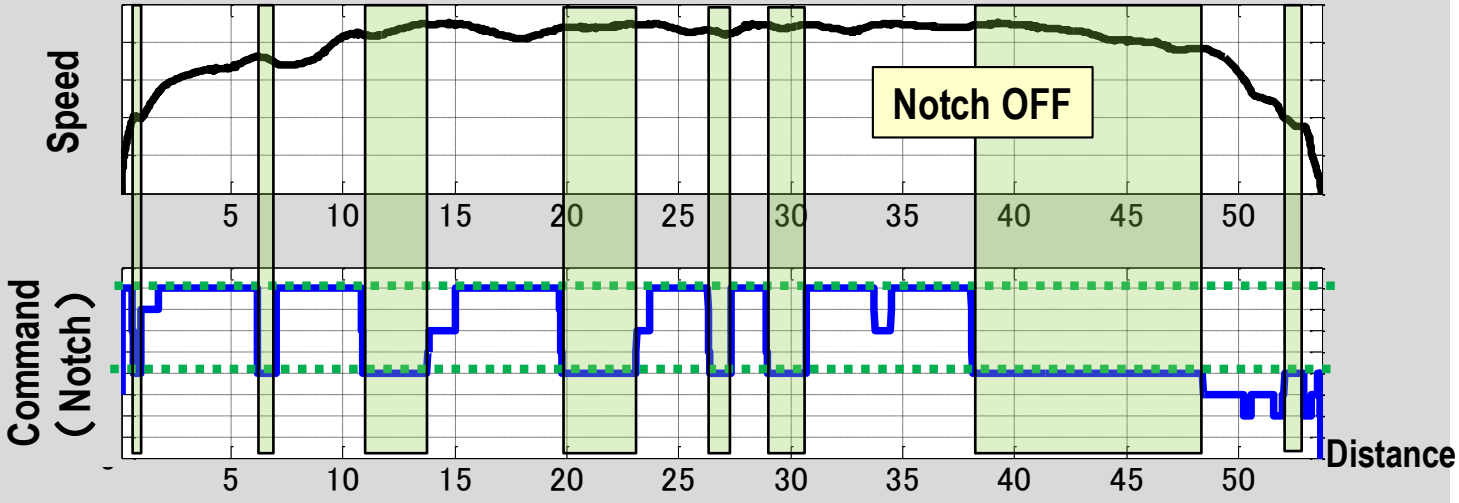
Operating A

■Electricity
654kWh
■Occupancy
Full



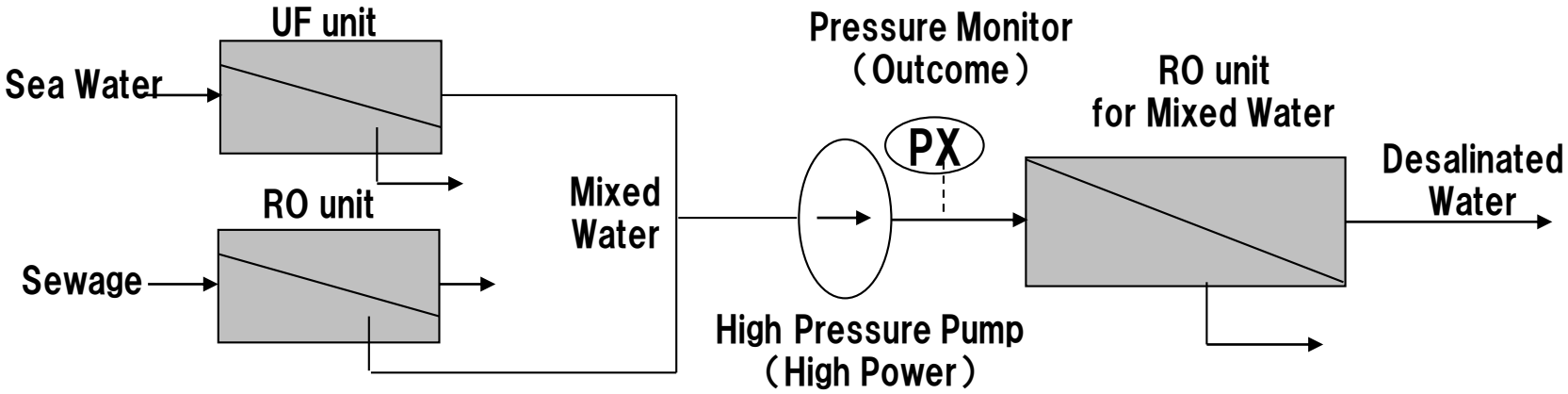
Operating B

■Electricity
532kWh
■Occupancy
30%



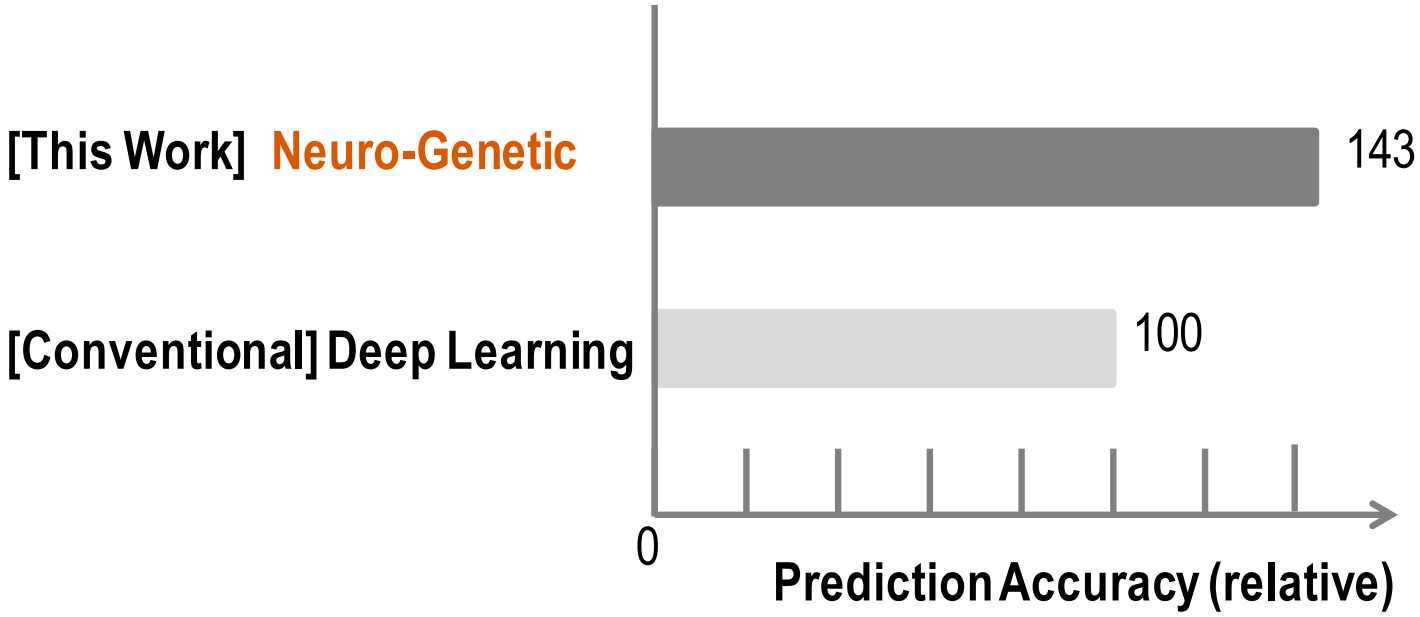
Water Plant: Electricity Saving

6% Saving in Electricity Cost

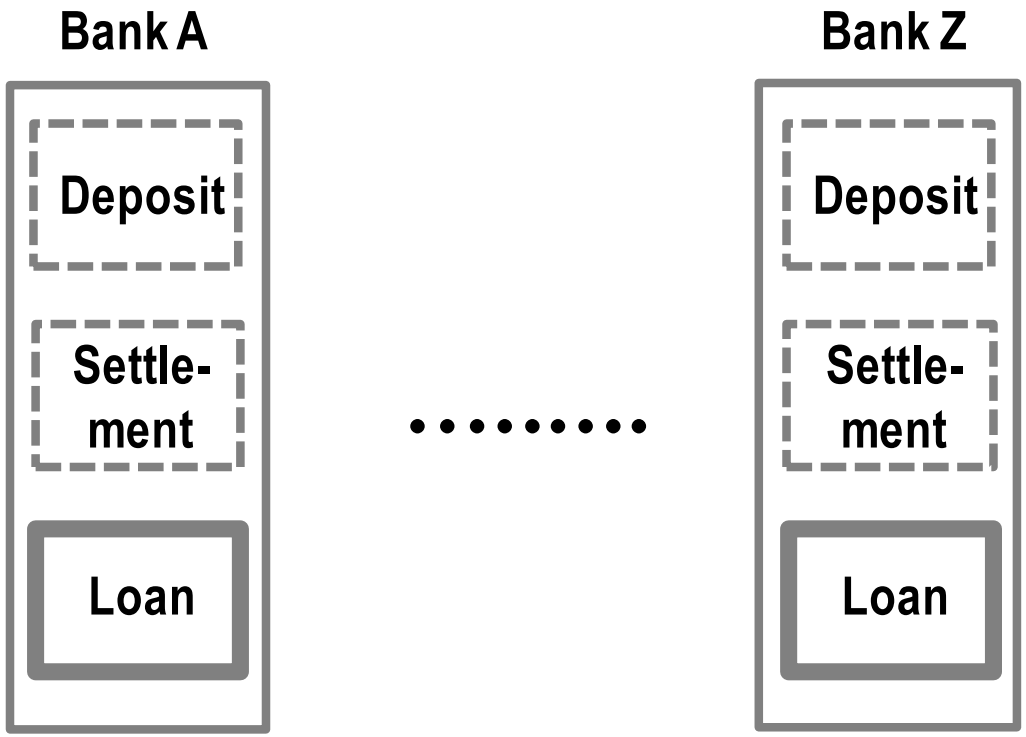


Water Desalination System (Remix Water)

Housing-Loan Default Prediction

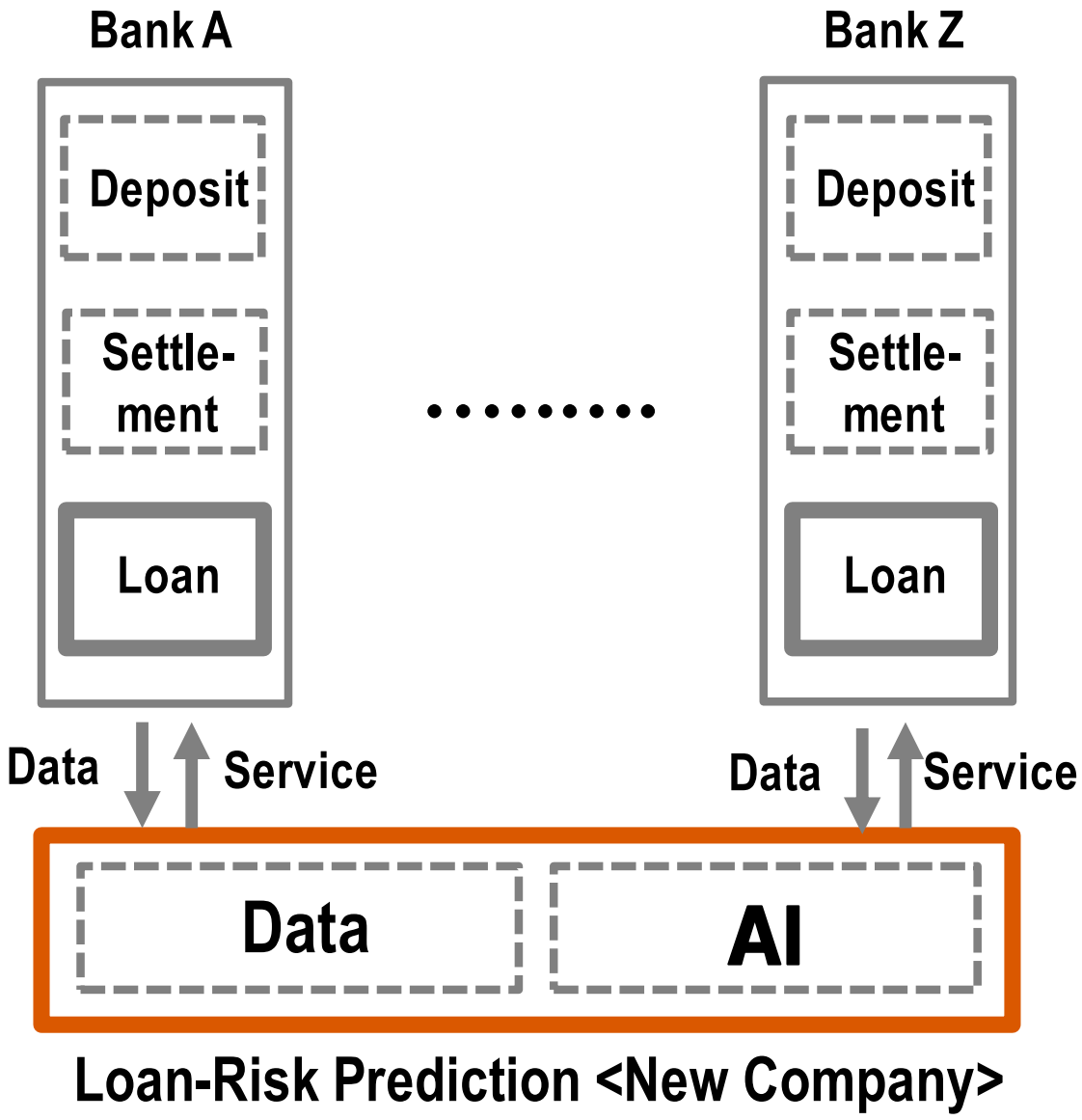


Conventional Banks



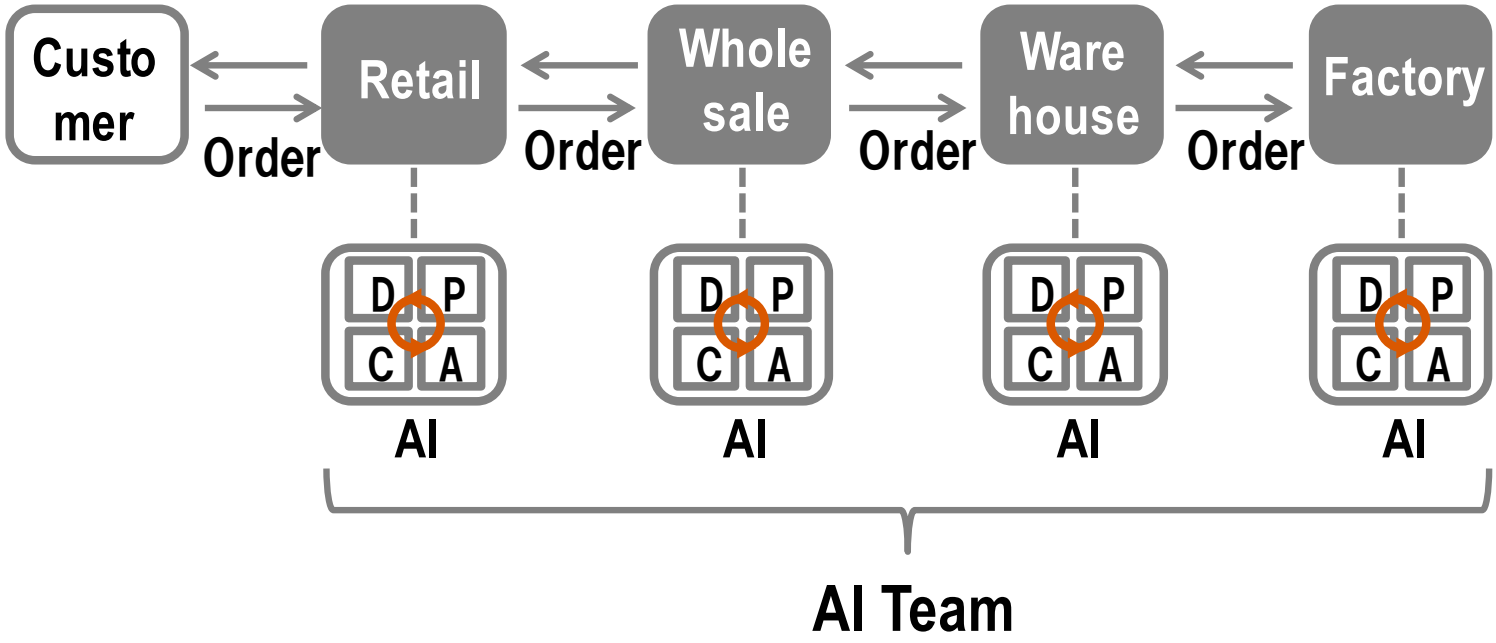
Renovation

Outcome-Oriented Banking



Meeting Supply with Demand

Minimize Loss（Inventory & Stockout）



Supply Chain

Loss

（Cumulative in 35 weeks）

Humans	2028 $
（After Practice）	
AI	489 $

Multi-Purpose AI

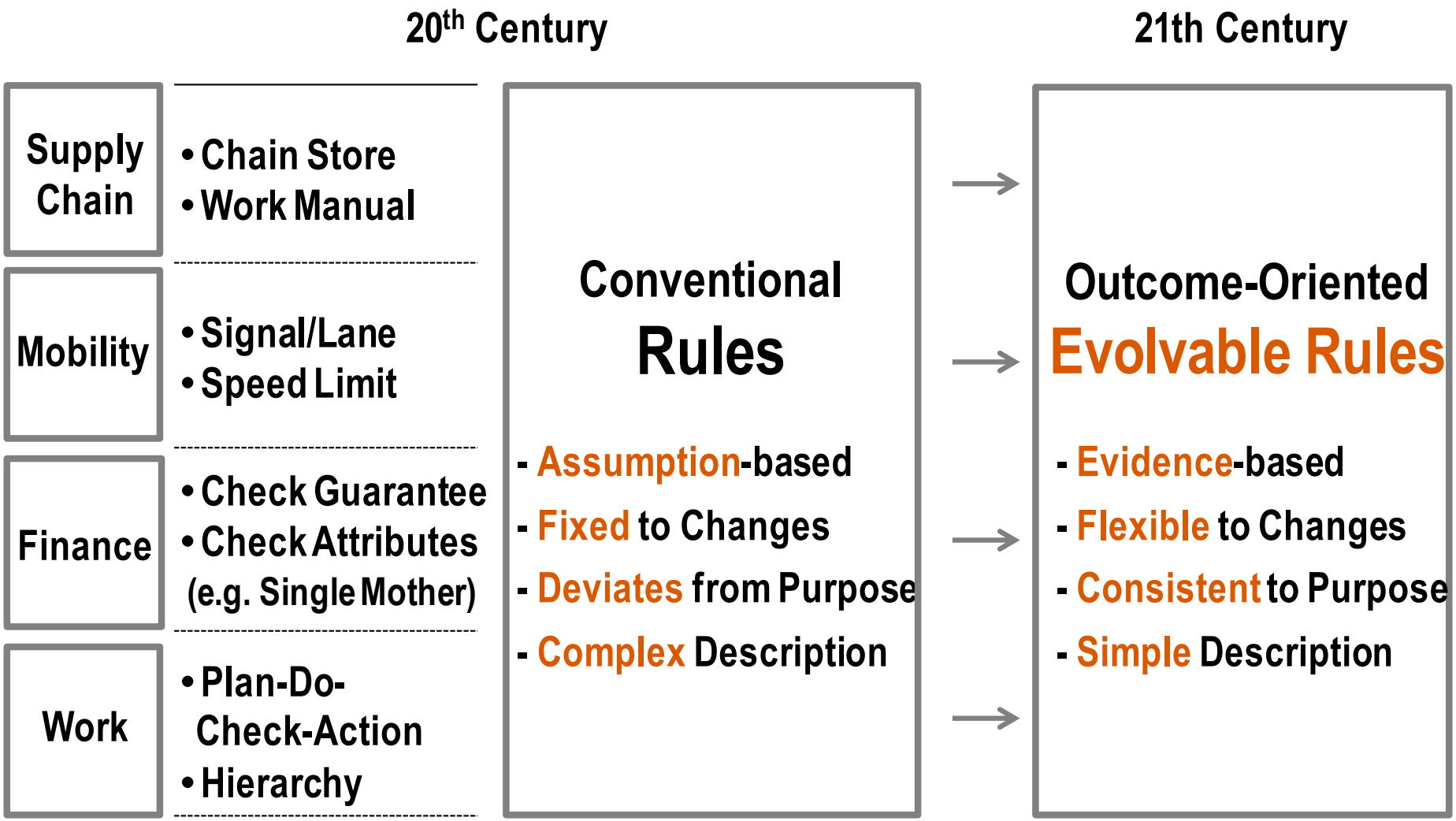
Hitachi AI Technology/H

14 Domains

60 cases

Does AI Replace Labor?

Upgrade the Concept of Rules



Artificial Intelligence

From Rule-Oriented

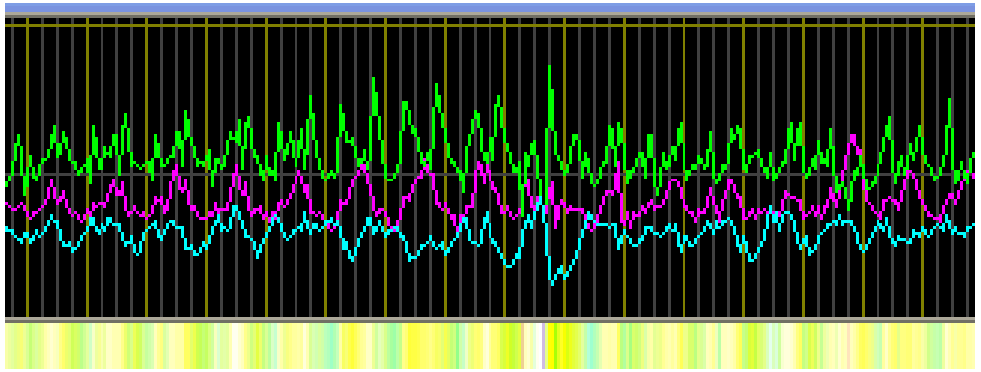
To Outcome-Oriented

Physical Motion

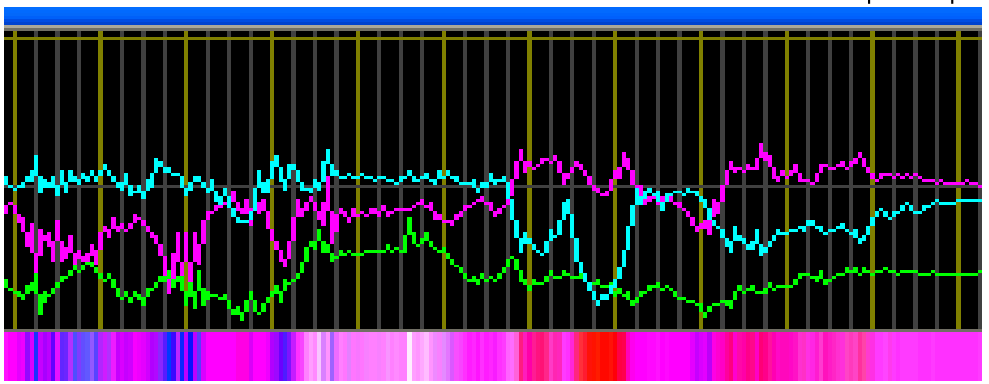
Wristband Sensor

Badge Sensor

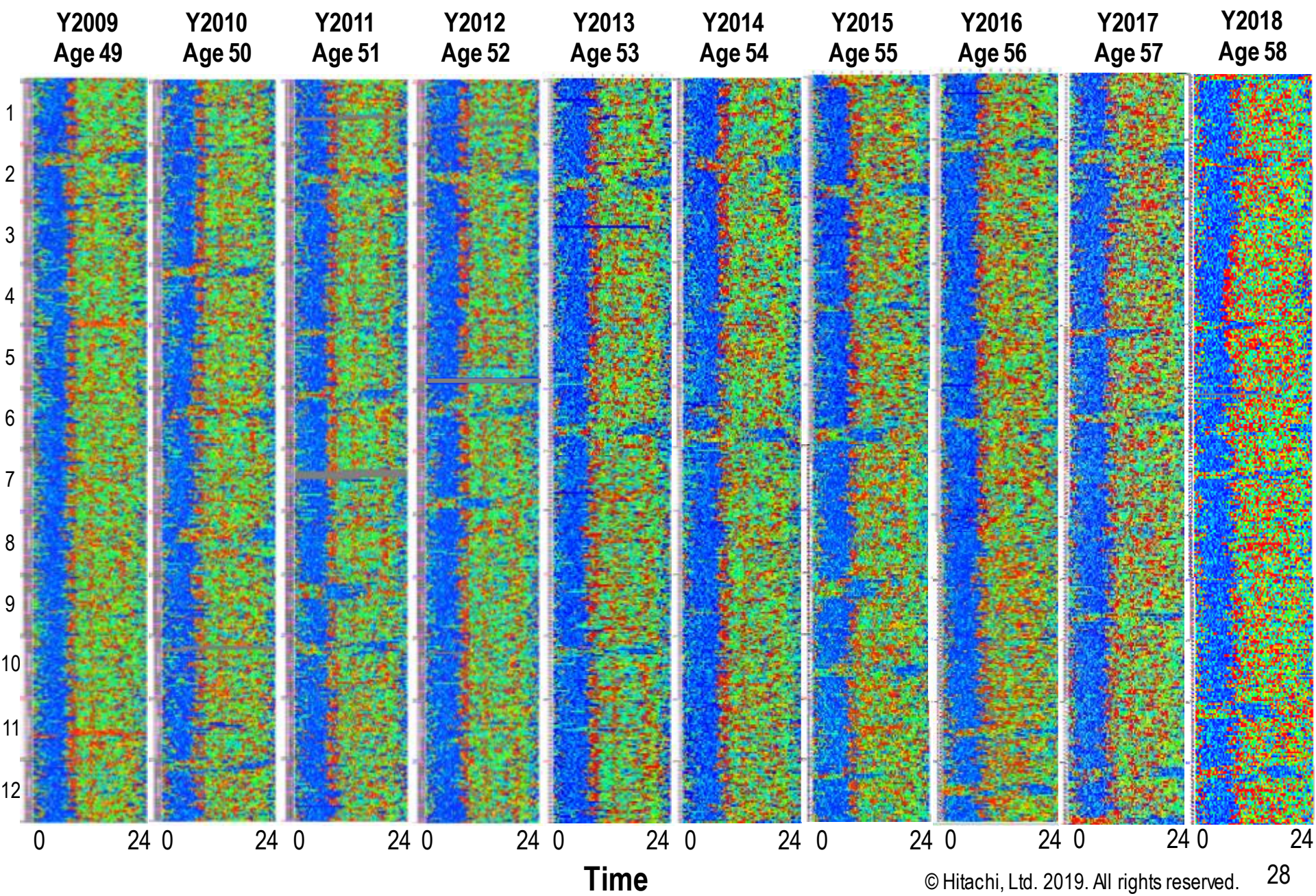
Walk 2Hz 1S



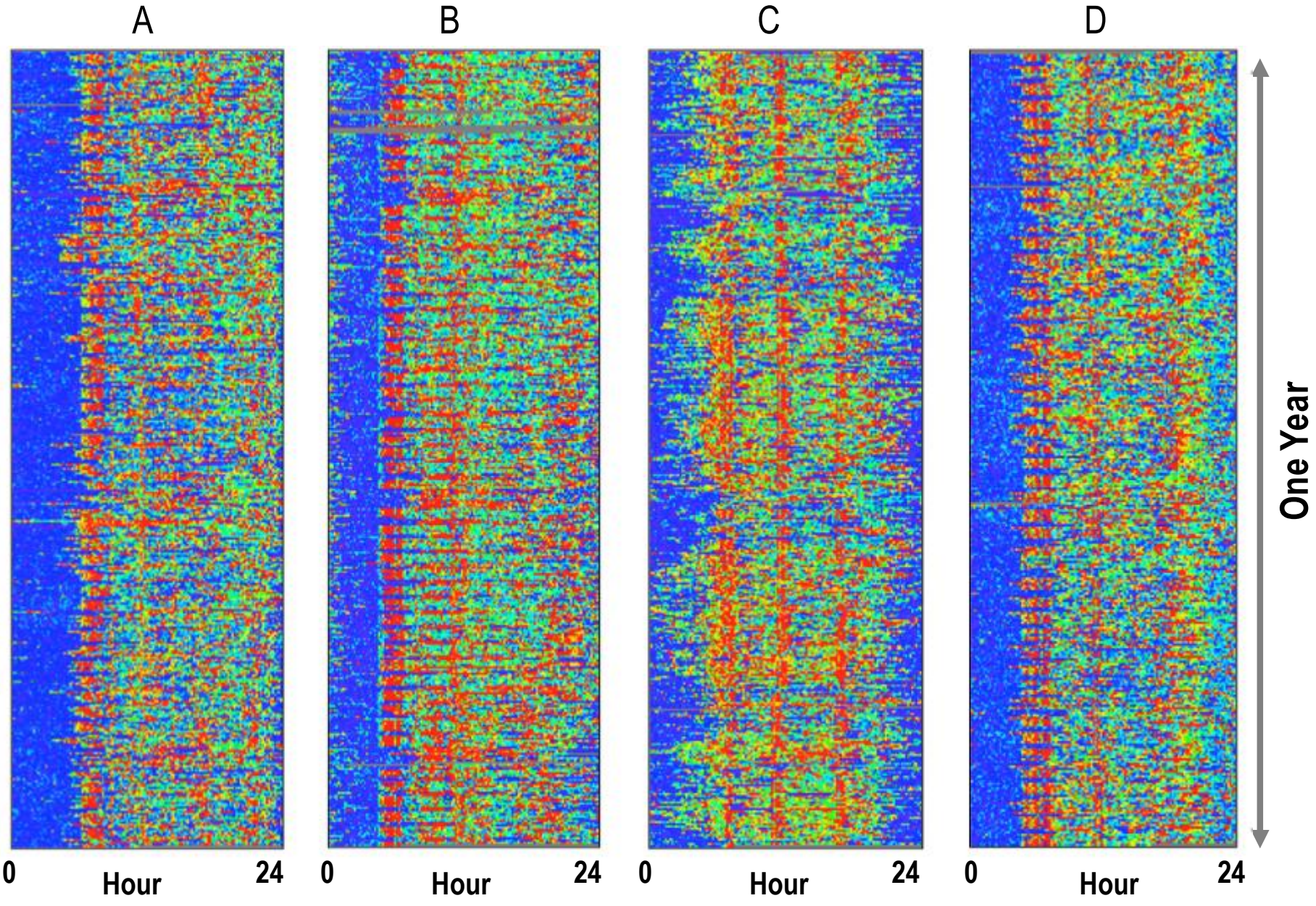
E-Mail 0.8Hz 1S



My Life has been Recorded for 12 Years every 50 ms



"Life Tapestry(R)" of Four Persons



1,000,000 Days

Collected Human-Behavior Data Last 13 Years

Happiness

Does it depend on individual, era & culture?

Universal Aspects of Happiness

	Unhappy State	Happy State
Mood	•Depressed •Negative	•Bright •Positive
Task	•Unfocused •Unengaged	•Focused •Engaged
Human Relation	•Feel helpless •Feel disliked	•Feel helpful •Feel liked
Physical	•Appetiteless •Sleepless	•Eat delicious •Sleep well

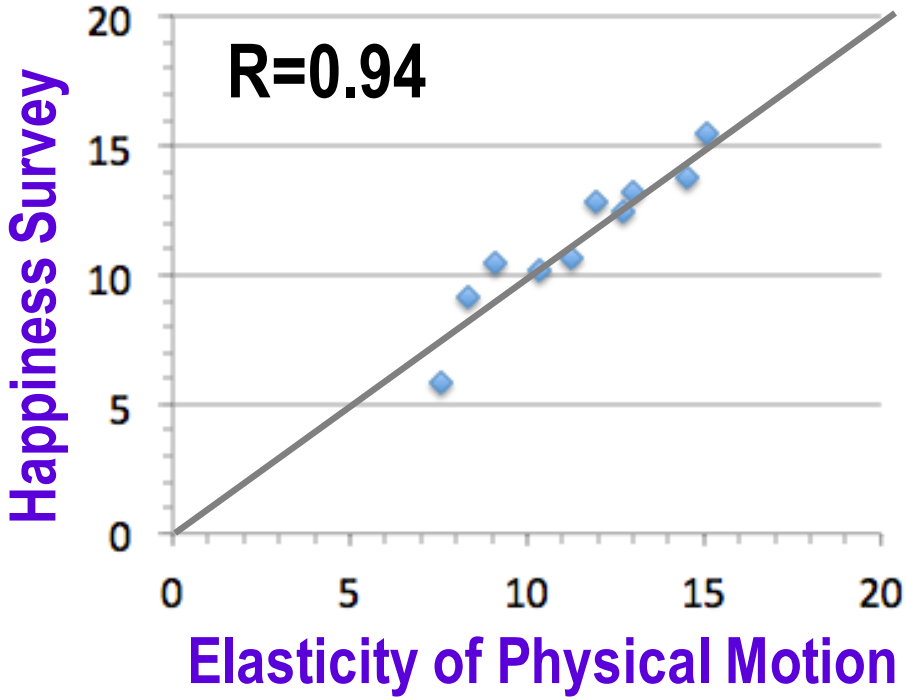
Elasticity of Motion Represents Collective Happiness

Happiness Questionnaire

20 questions on last week's

happiness, enjoyment,

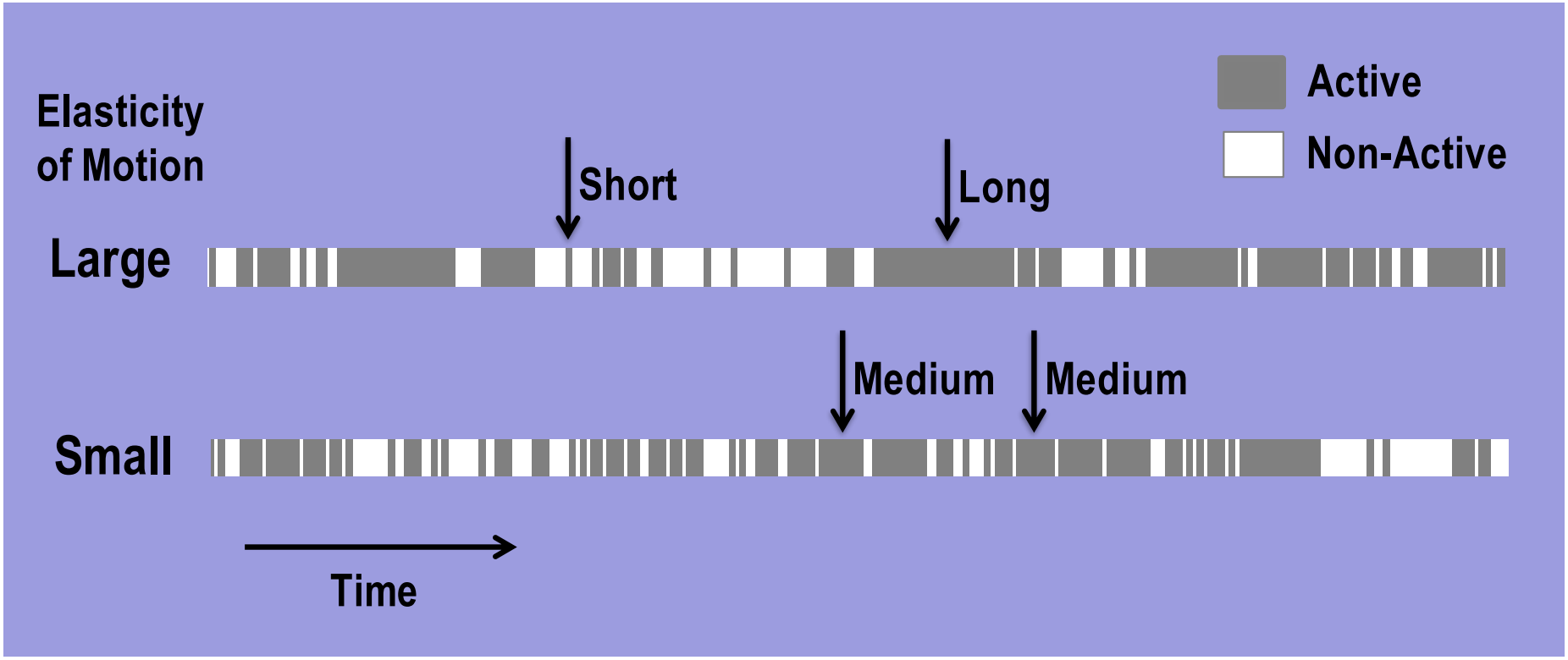
solitude, sadness, etc.



5 billion records: 10 organizations, 468 persons, 5000 man-days

Hidden Pattern behind Happy People

Elasticity in Motion Length



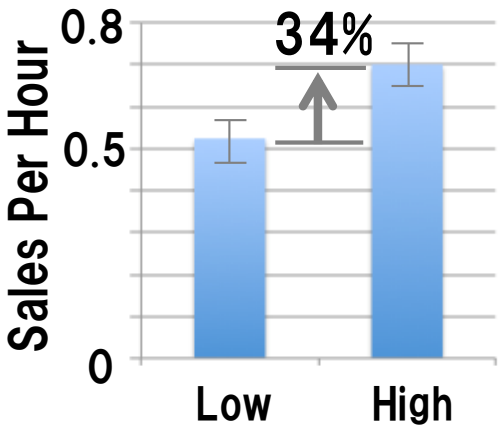
Making Others Happy

Quantified

Making Others Happy

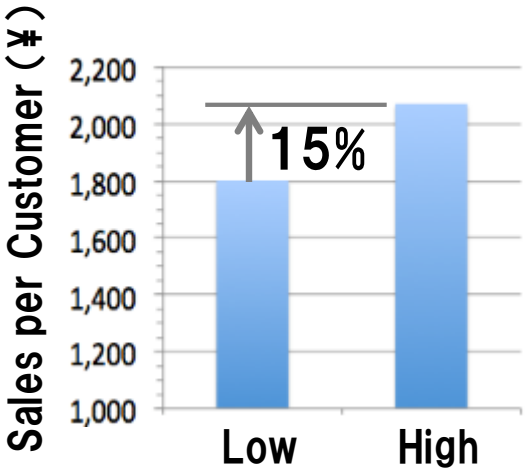
Productive

Call Center



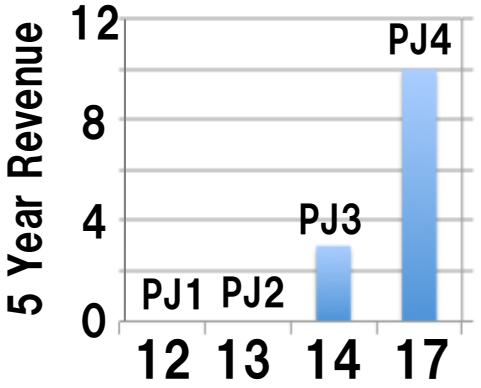
Making Others Happy
＝ Diversity of Motion
(Daily Average)

Store



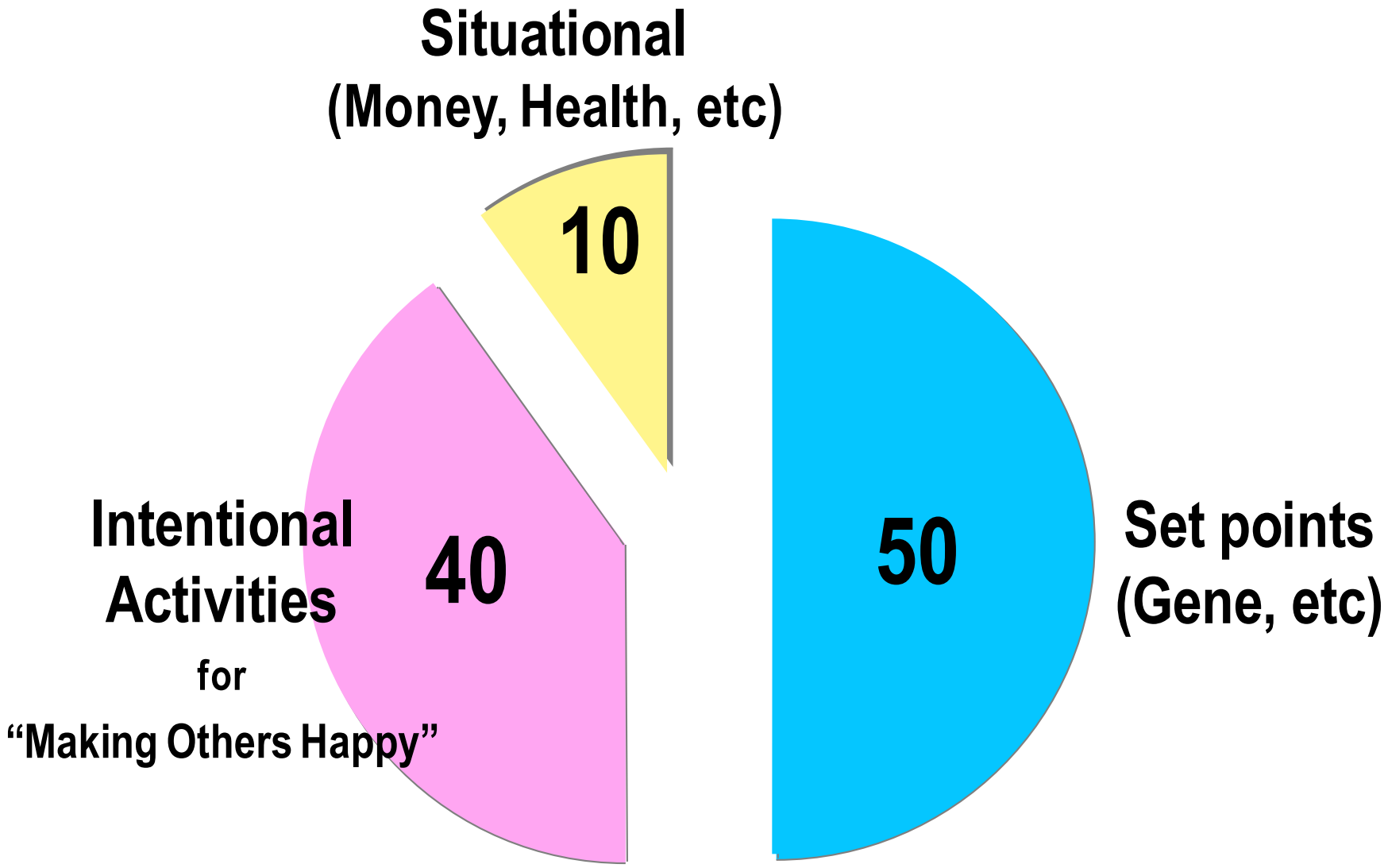
Making Others Happy
＝ Diversity of Motion
(Daily Average)

Development Project



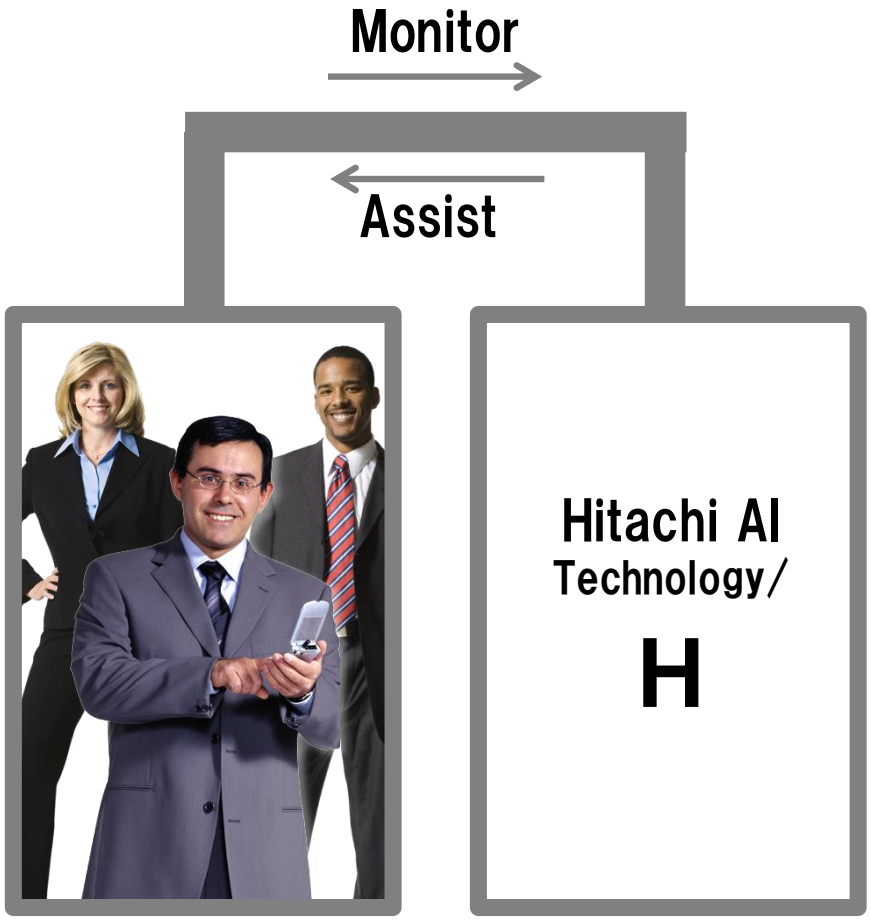
Making Others Happy
＝ Diversity of Motion
(First 2 Month)

Origins of Happiness



S. Lyubomirsky, et al, Rev. Gen. Psychology, 2005

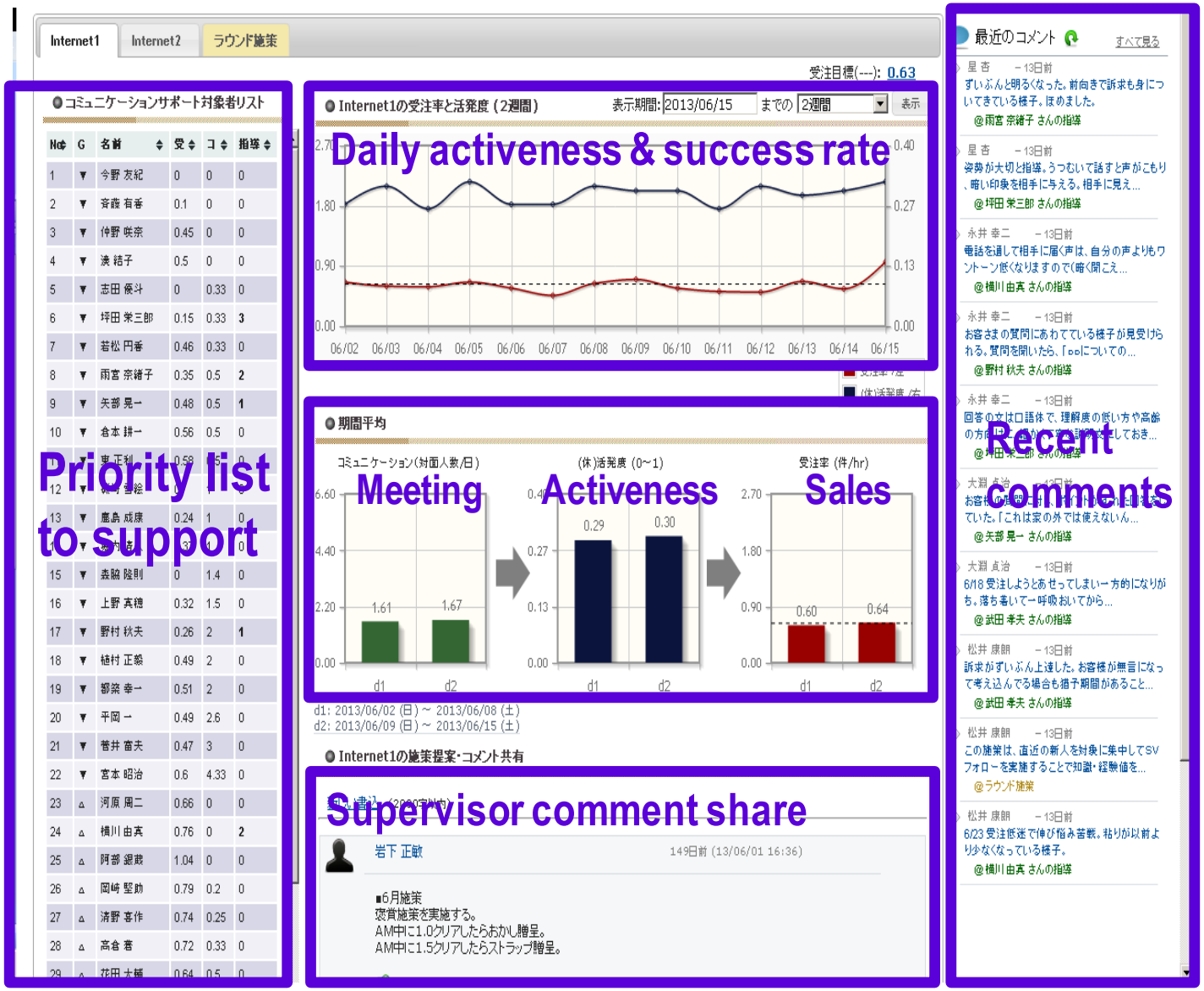
Empower Human



Support Organizational Learning & Growing

- ◆Outcome is Collective Happiness
- ◆Daily Advice by AI for Better Communications

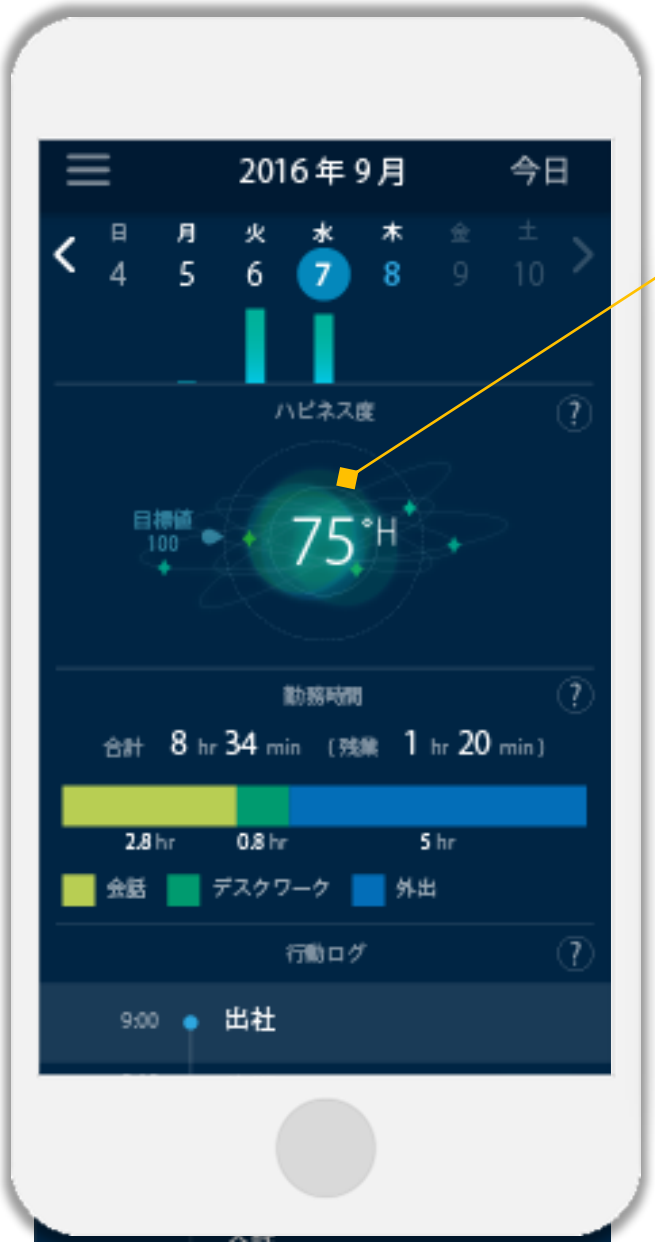
Dashboard for Supervisor



Sales Success Rate 27%↑

Employee Happiness ↑

Happiness AI Application



Activation Visualization

Type Diagnosis & Advice

Evidences

Hitachi Utilizes AI

600 Sales Employees in Hitachi Group Use AI

（2016.6.27 News Release）

Olympic of
Making Others Happy

News Release, Hitachi
October 3rd 2017

Measurement of Making Others Happy Now by Smart Phone App

Smart Phone App “Happiness Planet”

Daily Trend of Making Others Happy

Ranking of Making Others Happy

September 2018

175 teams

1623 people

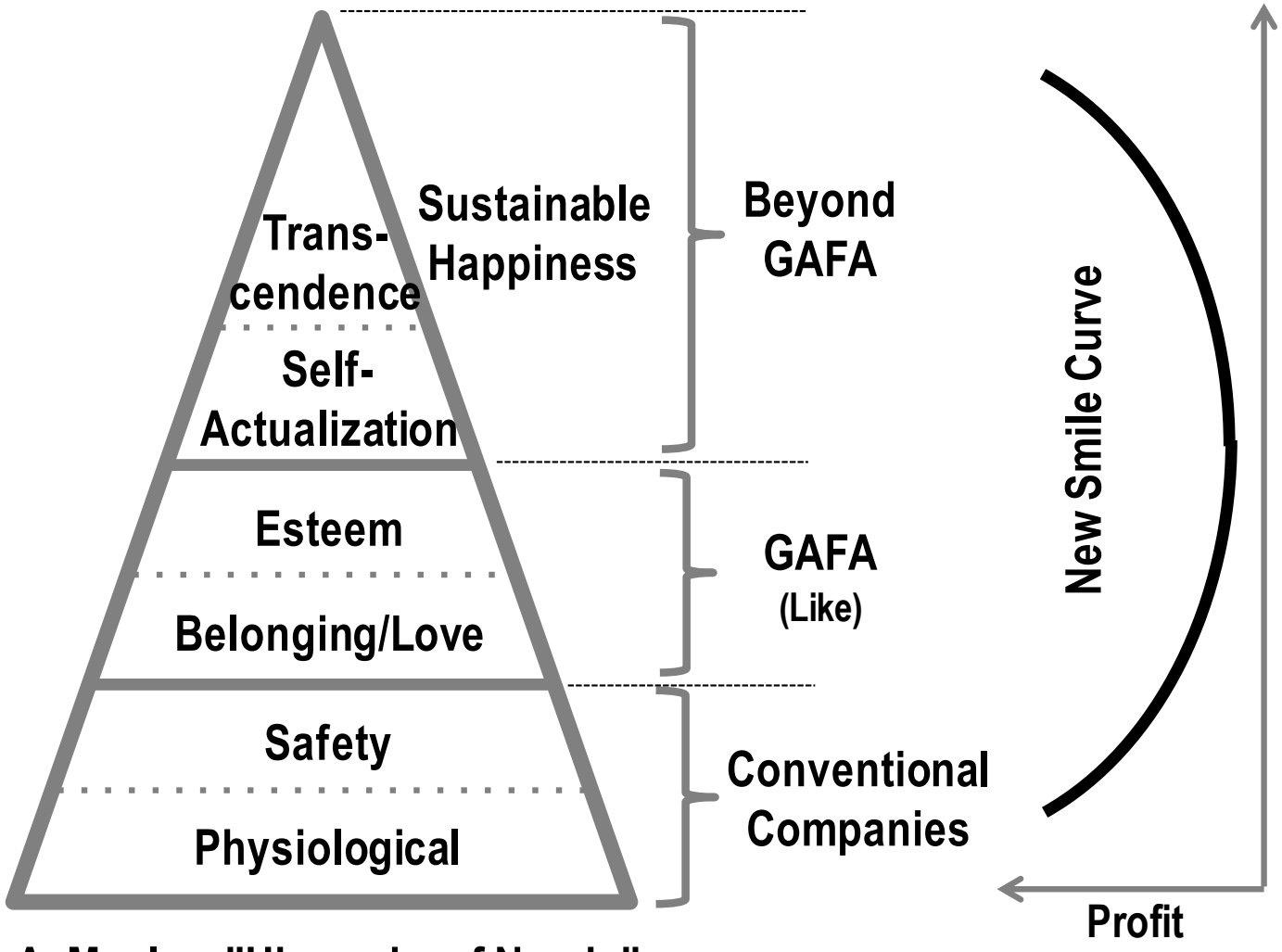
100 organizations

App Helps Improve Making Others Happy

Daily Challenge Menus

Select and Visualize

Sustainable Happiness
Beyond-GAFA Opportunities



A. Maslow "Hierarchy of Needs"

Our planet is made happier, scientifically

Key is "Making Others Happy"


“Making Others Happy” is Quntified


"Making Others Happy"
makes oneself happy


One who makes others
happy is productive

Billions of people having smart phones are welcome to this move

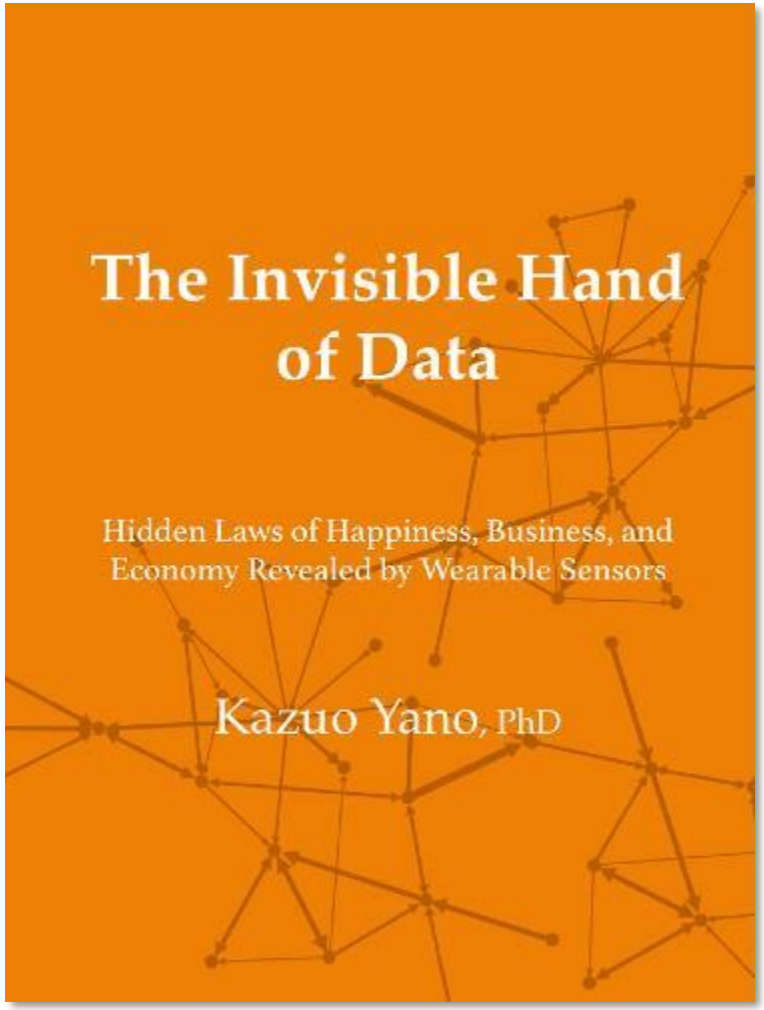
Conclusions

1. AI releases us from standardized rules for unceasing experiment for learning for limitless new possibilities.

2. The highest objective of learning is the happiness of the people towards technology for powering good.

The Invisible Hand of Data

Hidden Laws of Happiness, Business & Economy
Revealed by Wearable Sensors



English version is now available (April, 2019)

“The Invisible Hand of Data”
Top-10 Business Books in 2014 in Japan

①Zero to One (Peter Thiel)17pt
②The New Geography of Jobs (Enrico Moretti)14pt
③The Key (Lynda Gratton)13pt
③The End of Competitive Advantage (Rita McGrath)13pt
⑤Seeing What’s Next (Clayton Christensen)12pt
⑥The Leadership Challenge(James Kouzes) 11pt
⑥The New Digital Age （Eric Schmidt） 11pt
⑥Give & Take (Adam Grant) 11pt
⑨**The New Invisible Hand (Kazuo Yano)** 9pt
⑨Creating Innovators （Tony Wagner） 9pt
⑨Courage to be hated （Ichiro Kishimi） 9pt