Monozukuri in 21st Century

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Expansion of Production Network

- The 2\textsuperscript{nd} unbundling, i.e., international division of labor in terms of production processes and tasks, has developed since the 1980s.
- The 2\textsuperscript{nd} unbundling in the manufacturing sector is most advanced in East Asia.

Source: Richard Baldwin / Fukunari Kimura
The Fragmentation Theory

Before fragmentation

Large integrated factory

After fragmentation

PB: production blocks
SL: service links

Source: Fukunari Kimura

The Evolution of Production Networks: Illustrations

(a) Cross-border production during

(b) Production "network" in electronics industry

(c) Production "network" in automobile industry

Source: Anka and Kimura (2010): Modified
Industrial Cluster and Supporting Industries

- In the Automobile Sector, industrial clusters are growing.
- "Kanban Method" and "Kaizen Movement" covers the whole clusters
- Strong and broad supporting industries are indispensible for strong Clusters

Thailand

- Auto makers 15 Companies
- Tier 1: 700
- Tier 2/3: Around 1,700
- Suppliers (JPM Affiliate 750)

Production in 2012: 2.4MM Units

Indonesia

- Auto makers 15 Companies
- Tier 1: 250
- Tier 2/3: Around 500
- Suppliers (JPM Affiliate 370)

Production in 2012: 1.07MM Units

Malaysia

- Auto makers 18 Companies
- Tier 2/3: Around 390
- Suppliers (JPM Affiliate 140)

Production in 2012: 0.37MM Units

(Ref.) Japan

- Auto makers 12 Companies
- Suppliers Around 0.000

Production in 2012: 0.0.4MM Units

Underlying Japanese Pylosophy for Monozukuri

- Origin of the word "Economy"
  = Oikos+Nomos (Household Management)
  Essence; Pursuit of Efficiency
  Japanese translation (150 years ago)「経濟(Keizai)」
  ←「經世濟民」(Sui Dynasty)
  Meaning; Managing the country and helping people

- Strong Community Ties in rural agricultural communities
- Appreciation of Craftsmanship
- War time Mobilization of SMEs
- "Mono" has dual meaning; 「物(Thing)」「者(person)」

- Economic activity is seen as Community activity
- Monozukuri is seen as imprinting personality into things
Core essence of Monozukuri=“Genba-ryoku”
✓ “Genba ryoku” (On site power) is the collective ability to provide solution to various issues at the production site, and also the ability to find and identify such issues.
✓ Issue identification: Ability to grasp the whole production process and role of each player/Understanding about final objectives and ability to think and act in other persons position.
✓ Solution: Knowledge and teamwork to produce “Collective Genius”, feedback to total process
✓ Participation of all member in the production process in the cycle of issue identification and solution

Connectivity with production network; the key for innovation
✓ Improved connectivity with production network will induce innovation
✓ Process innovation is indispensable pre-requisite for product innovation

Source: ERIA, Comprehensive Asia Development Plan 2.0.

How to mitigate “r>g” trend?
➢ Capital has stronger power because it lays the ground for issue-setting and issue-identification.
➢ If workers just follow the instruction of Manuals and provide solution only, labor will become subordinate of capital.
➢ Labor’s contribution to economic activity, and return from it, will be improved only if each worker improve the ability of issue identification
Industrie 4.0; Challenge and Opportunity

- Challenge; If Industrie 4.0 will be developed with the single purpose to reduce cost by substituting labor with IT, the job opportunity will be reduced.
- Opportunity; If Industrie 4.0 will function to improve connectivity among various players in the economy, it will improve productivity and can create various job opportunity.
- How to achieve “People-Centred Industrie 4.0” is the key.
- Monozukuri education can complement the movement of Industrie 4.0, by strengthening ability of workers for issue-identification and issue-solution.

Conclusion

- Change the notion about the basic function of “economy”, from “pursuit of money” to “mutual support”.
- Spread the concept of “human-centric Monozukuri”, through education programs which nurtures labor force who grasp total production process and can conduct issue-identification and issue-solution collectively.
- This is indispensable to achieve “human-centric Industrie 4.0” and increase “Quality Job Opportunities”