



Operationalization of un-captured GDP - Innovation stream under new global mega-trends



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ABSTRACT

With the understanding that current ICT-driven global development depends on a trend shifting from traditional co-evolution of computer-initiated ICT, captured GDP, and economic functionality to new co-evolution of the Internet, un-captured GDP, and supra-functionality beyond economic value, the following hypothetical view was postulated:

The disparity between the world's ICT leader countries with respect to happiness/welfare amidst great stagnation (Finland) or conspicuous economic growth (Singapore) can be attributed to the difference of the state in the above shifting trends.

The foregoing hypothetical view was demonstrated on the basis of an empirical analysis measuring dependency on un-captured GDP, which is a key factor identifying the state of the shifting trends. This dependency is based on a comprehensive review of the consequences of three mega-trends that lead to the respective co-evolution and on the review of the development of trajectories relevant to these mega-trends.

Noteworthy findings were obtained on the consequences of the development trajectory option, particularly on the shift from traditional co-evolution to new co-evolution resulting in differences in interactive return gain structure. Also significant policy suggestions essential for identifying government/business roles in the context of new innovation stream were received. The importance of transferring government ability in innovation, collaboration and absorption to business was stressed, as this creates a virtuous cycle between "muscular" economic environment development and increase in the "muscularity" of indigenous firms.

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1. Introduction

1.1. ICT-driven development under Co-evolution of 3 mega trends

Advances in information communication technology (ICT) can largely be attributed to the dramatic advancement of the Internet.¹ This has changed the computer-initiated ICT world significantly. The Internet promotes free culture, the consumption of which

provides utility and happiness to people but cannot be captured by GDP data (Lowrey, 2011 [18], Rifkin, 2014 [22]). With a greater volume of unpriced digital goods introduced each year, this traditional GDP heuristic is becoming less useful (Brynjolfsson and McAfee, 2014 [2]).

Un-captured GDP has become the major source of consumer's utility (happiness in consumption) as analyzed in an earlier paper (Watanabe et al., 2015 [32]). This corresponds to consumer preferences shift from economic functionality to supra-functionality beyond economic value, encompassing social, cultural, aspirational, tribal, and emotional values. This shift, in turn, induces further advancement of the Internet, leading to a co-evolution of the foregoing three mega-trends (advancement of ICT, paradigm change and people's preferences shift).

Consequently, the current ICT-driven global development

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¹ As shown by Tapscott in his best-seller "The Digital Economy" (1997) [26], the Internet has changed the way of business and daily life dramatically. The digital economy is also known as the Internet economy, the new economy, or web economy.

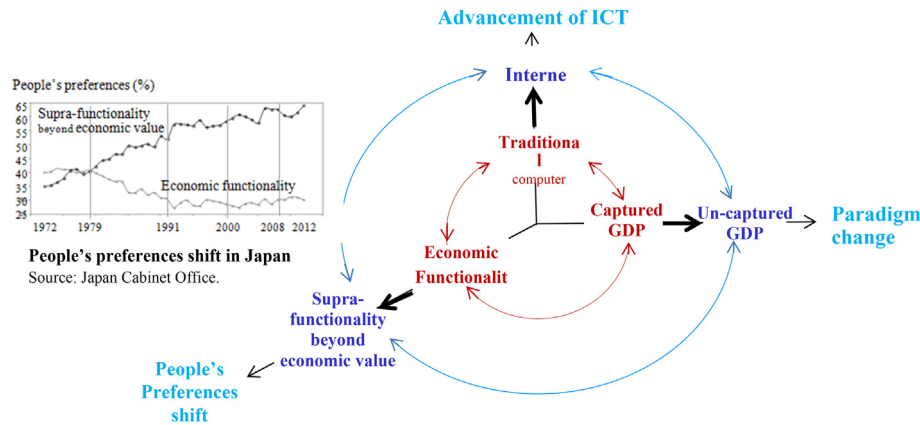


Fig. 1. Shifting Trend in the Co-evolution of the 3 mega-trends.

depends on the shifting trend in the following contrasting co-evolutional mega-trends as illustrated in Fig. 1:

- a. Traditional co-evolution of ICT, captured GDP, and economic functionality.
- b. New co-evolution of the Internet, un-captured GDP, and supra-functionality.

1.2. High competitiveness by global ICT leaders

1.2.1. Highest competitiveness during the great stagnation

While the majority of countries that are advanced in ICT confront “the great stagnation” due to a trap in ICT advancement (Watanabe et al., 2015, 2015 [31,32]), certain countries can sustain their highest ICT-driven global competitiveness as demonstrated in Table 1. This suggests resilience beyond economic value.

Table 1 suggests that Finland and Singapore, which hold the leading positions in both world ICT ranking and global competitiveness ranking, can be considered countries of resilience on ICT-driven global competitiveness.

1.2.2. Competitiveness structure in ICT-Advanced countries

Inspired by the foregoing observation, Table 2 compares institutional factors governing competence in 12 ICT-advanced countries in 2013.

Table 2 shows that Finland and Singapore, which are regarded as ICT-driven countries of resilience on ICT-driven global competitiveness share a notable similarity on institutional competitiveness as global competitiveness, ICT competitiveness, qualities of human capital and educational system and similar population size. They demonstrate significant disparity on economic performance (GDP/capita, GDP growth rate, unemployment ratio) and welfare/happiness level (inequality, birth rate, happiness).

Table 1
World ICT ranking top 5 countries (2011–2014).

ICT ranking	1	2	3	4	5
2014	Singapore (2)	Finland (4)	Sweden (10)	Netherlands (8)	Norway (11)
2013	Finland (3)	Singapore (2)	Sweden (6)	Netherlands (8)	Norway (11)
2012	Finland (3)	Singapore (2)	Sweden (4)	Netherlands (5)	Norway (15)
2011	Sweden (3)	Singapore (2)	Finland (4)	Denmark (8)	Switzerland (1)

Figures in parentheses indicate global competitiveness ranking.

Sources: The Global Information Technology Report (WEF, annual issues), The Global Competitiveness Report (WEF, annual issues). [34–38]

1.3. Conspicuous contrast in growth rate between ICT leaders

Based on the foregoing review, Fig. 2 shows the contrast between economic performance represented by GDP growth rate and happiness/welfare level in 12 ICT-advanced countries.

Fig. 2 demonstrates a conspicuous contrast between the world's ICT leader countries, Finland and Singapore, with respect to their GDP growth rates and happiness/welfare levels. Despite the great stagnation of 0.57% p.a., Finland enjoys the highest level of happiness/welfare, as demonstrated by inequality (the lowest level of inequality between nations measured by GINI index in 12 ICT-advanced countries compared), birth rate (the highest level after Israel and the US) and happiness score (the highest level after Denmark, Norway and Switzerland, which share the world top 3 levels). Singapore has the lowest level of happiness/welfare as well as the lowest inequality (highest GINI index) and birth rate and almost the lowest happiness score, notwithstanding its conspicuously high GDP growth rate as 5.85% p.a.

1.4. Hypothetical view

There is a conspicuous contrast between the world's ICT leaders as ICT-driven countries of resilience with respect to ICT-driven global competitiveness. Happiness/welfare under the great stagnation in Finland and economic growth in the “choking society” of Singapore prompt us towards a hypothetical view that such a contrast can be derived from the difference of the state in the shifting trend within 3 mega-trends (Fig. 1).

Table 3 compares the magnitude of the Internet use between Finland and Singapore in 2013.

The table shows that contrary to Finland's high dependency on the Internet, Singapore's dependency remains at a relatively lower level. Singapore's online shopping experience ratio remains at 30%, and its share of retail sales remains at 2% – much lower than Finland's 48% and 9%, respectively. A similar contrast can be observed

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