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New paradigm of ICT productivity – Increasing role of un-captured GDP and growing anger of consumers



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ABSTRACT

The dramatic advancement of the Internet has led all nations to an information communication technology (ICT) driven development trajectory. This trajectory has resulted in bi-polarization between ICT growing economies and ICT advanced economies. While the former enjoys a virtuous cycle between ICT advancement and productivity increase, the later has fallen into a trap of a vicious cycle between ICT advancement and productivity decrease.

This paper identifies that this trap can be attributed to the two-faced nature of ICT in which advancement of ICT contributes to price increases due to functionality development while dramatic advancement of the Internet has resulted in price decreases due to freebies, easy copying and standardization.

Based on an empirical analysis of a customer preference shift from economic functionality to supra-functionality beyond economic value, this paper unveils the increasing conflict between captured GDP and un-captured GDP derived from the Internet advancement which promotes a freer culture, the consumption of which provides utility and happiness but cannot be captured through GDP data that measures revenue.

It was demonstrated that this conflict has led to an emerging growing anger of consumers which can be transformed into a springboard for new innovation leading to a trigger of innovation-consumption co-emergence.

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1. Introduction

Dramatic advancement of the Internet beyond anticipation in terms of its diffusion speed and scope has led all nations of the world information communication technology (ICT) driven economic development trajectory (UNDP,

2007 [30]; McKinsey, 2011 [22]; WEF, 2012 [39]; MIC, 2012 [23]).

This trajectory has resulted in bi-polarization between ICT growing economies and ICT advanced economies (Zhao et al., 2013 [41], Watanabe et al., 2014a [36]). While the former economies enjoy a virtuous cycle between the advancement of ICT and increases in marginal productivity, the later economies have fallen into a trap of a vicious cycle between advances in ICT and decreases in marginal productivity.

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While a dramatic advancement of ICT provides strong anticipation of significant economic growth, contrary to such anticipation, economic growth engine, particularly in ICT advanced economies has disappeared resulting in the great stagnation (Cowen, 2011 [7]). This can be attributed to the two-faced nature of ICT in which advancement of ICT contributes to increase its marginal productivity and subsequent price increases due to new functionality development while dramatic advancement of the Internet has resulted in price decreases due to freebies, easy copying and mass standardization (Watanabe et al., 2014b [37]).

To date, significant numbers of analyses demonstrated the impacts of ICT advancement on socio-economy triggered by Nobel laureate Solow's "Productivity Paradox" (Solow, 1987 [27]) and reaction to it by Brynjolfsson (1993) [1]. This reaction was followed by more sophisticated models to tease out the relationship between ICT and productivity (Brynjolfsson and Hitt, 1996 [2], Lichtenberg, 1995 [16], Kraemer and Dedrick, 1994 [15], Dedrick and Kraemer, 2001 [8]).

By the late 1990s there were some signs that productivity in the workplace had been improved by the introduction of ICT, especially in the US. Brynjolfsson et al. found a significant positive relationship between ICT investments and productivity (Brynjolfsson and Hitt, 1998 [3], Brynjolfsson and Yang, 1999 [4]) prevailing popular consideration that there was no paradox (Triplett, 1999 [29]).

It was in the late of the first decade of this century a new paradox appeared to have emerged. This can largely be attributed to the third industrial revolution initiated by the dramatic advancement of the Internet (Rifkin, 2011 [26]). The Internet has transformed the way of peoples living, working, socializing and meeting, countries develop and grow. It has changed from a network for researchers to a day-to-day reality for billions people in two decades (McKinsey, 2011 [22]). Consequently, dramatic advancement of the Internet has changed computer initiated ICT world significantly. It has changed the entire system interactive, integrated and seamless. This interconnectedness is creating whole new opportunities for cross-industry relationships. The Internet promotes more free culture, the consumption of which provides utility and happiness to people but cannot be captured through GDP data that measure revenue (Lowrey, 2011 [17]).

Such a beyond anticipation issue derived from a dramatic advancement of the Internet and subsequent third industrial revolution inevitably emerged a new paradox of the advancement of ICT. Brynjolfsson, who first reacted to Solow's production paradox in 1993 (Brynjolfsson, 1993 [1]) raised the question: "Could technology be destroying jobs?" (Brynjolfsson and McAfee, 2011 [5]). They then expanded to explore whether advancing ICT might be an important contributor to the current unemployment disaster. They concluded that the root cause was not a decline in innovation but an acceleration of innovation. Technological advancement had moved so fast that many people were losing the race against the machine.

Cowen (2011) [7] analyzed similar problem. He argued that: "Contrary to the dramatic advancement of the Internet and subsequent ICT advancement, we were living through the consequence of a dramatic decrease in the rate of innovation." He argued that the consequence of slowing innovation was fewer new industries and less creative destruction, hence new jobs. He then suggested a possibility of the consequence of the two faced nature of ICT.

Notwithstanding such stimulating pioneering debates, particularly noteworthy suggestion of the two-faced nature of ICT, none has ever unveiled such nature and its impacts on the current great stagnation, particularly in ICT advanced economies (Ogden, 2012 [25], Watanabe et al., 2014b [37]).

Furthermore, while the sources of increasing discrepancy between captured GDP and un-captured GDP can partially be attributed to the shift of people's preferences from an economic functionality-driven preference captured by GDP to supra-functionality beyond economic value-driven functionality which cannot necessarily be captured by GDP (McDonagh, 2008 [21]) and this shift co-evolves with ICT advancement (Watanabe, 2009 [32]), none has ever analyzed this dynamism. Growing anger of consumers derived from increasing discrepancy in the transition (Watanabe, 2013 [35]) and a possibility of its transformation into a springboard for new innovation is another urgent issue to be solved.

In light of the significant consequence of the trap of the dramatic advancement of ICT in global economy both nations and firms that has been compelling their productivity decline resulting in the great stagnation in ICT advanced economies, its structural sources were analyzed first.

On the basis of an empirical analysis tracing the trend in marginal productivity of ICT and subsequent its prices in world ICT top leaders over the last two decades correlating with the effects of ICT, two faces of its advancement were identified.

Second, in light of the increasing role of un-captured GDP in correspond to increasing significance of supra-functionality beyond economic value in sustaining the consumption, substitution trend and its dynamism of supra-functionality beyond economic value for economic functionality as well as its co-evolution with ICT advancement were analyzed.

Since such a substitution and its co-evolution with ICT advancement can be typically observed in Japan which is extremely sensitive to institutional innovation against external shocks and crises (Hofstede, 1991 [11], Watanabe, 2009 [32]), an empirical analysis focusing on the shift in Japan's preferences over the last four decades and its correlation with the advancement of ICT was conducted.

Third, in light of the significance of growing anger of consumers as a consequence of increasing discrepancy between captured GDP and un-captured GDP in transition (Watanabe, 2013 [35]), and a possibility of transforming such anger into a springboard for new innovation, sources of the anger and its mechanism were analyzed.

On the basis of an empirical analysis on the general trend in marginal propensity to consume toward a post-excessive consumption society, possible option for

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