Volume 11 | Issue 41 | Number 4 | Article ID 4010 | Oct 13, 2013

'Data Will Change ICT,' But Will it Change the Abe Regime? データがICT（情報通信技術）の変革をもたらす」が、安倍政権の変革をもたらすだろうか

Andrew DeWit

This article focuses on the content and implications of a fascinating and inspiring October 1 presentation[1] by Japan's Ministry of Internal Affairs and Communications (MIC) at Aizuwakamatsu City, a smart city project[2] involving just over 130,000 residents in Fukushima Prefecture, the area battered by the 3.11 triple disaster of earthquake, tsunami and nuclear meltdown. The presentation was titled "Data Will Change ICT." ICT is an acronym for "Information and Communications," a core area of innovation evident in the everyday ubiquity of smart phones and other mobile devices. The MIC presentation offers a summary of the Japanese political economy's performance in this strategic area as well as its impressive further potential. The presentation also reveals that Japan's ICT-centred growth strategy was officially launched by the Abe cabinet on June 14, 2013.

After reviewing the presentation's content, I inquire why the Abe cabinet is not stressing this potential in the discourse it aims at overseas and domestic investors. The ICT initiative has immediate and obvious application to the Fukushima Daiichi crisis. It thus seems imperative that the Abe cabinet grasp this opportunity to move beyond the problems associated with the continuing unfolding of the Fukushima disaster. Properly managed, Japan's ICT strategy could maximize the national interest while at the same time making a signal contribution to global sustainability.

ICT and the Japanese Economy

The MIC's "Data Will Change ICT" presentation makes clear that the role of ICT in the Japanese economy is already large. As shown in figure 1, nominal output[3] by the various sectors of the Japanese economy totaled YEN 918.6 trillion in 2011. The ICT industry represented 9% of that output, or YEN 82.7 trillion. This total was considerably larger than such sectors as Wholesale, which accounted for 6.5% of economic activity or YEN 59.4 trillion. Construction, once the bloated king of Japan's domestic economy, accounted for 5.6% of economic activity or YEN 51.2 trillion. Transportation followed, at 4.3% of economic activity, or YEN 39.4 trillion. Next was Retail, at 4.1% of economic activity or YEN 37.8 trillion.

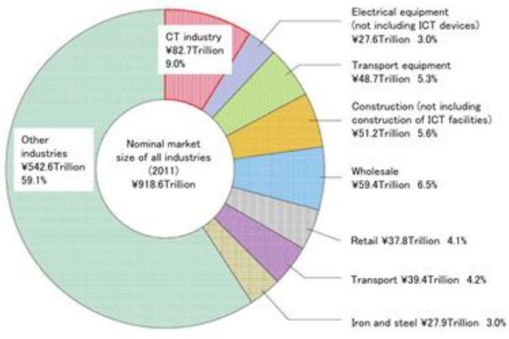

Figure 1: Nominal market sizes of major industries (based on nominal domestic production, 2011)

The MIC's data also show, as seen in figure 2, that nominal output in the ICT sector was YEN

85.7 trillion versus the YEN 82.7 trillion that it was in 2011. The construction sector was roughly the same size as the ICT sector in 1996, both being about YEN 86 trillion. But whereas ICT shrank to just under YEN 83 trillion as of 2011, the construction sector shrank to YEN 51.2 trillion, excluding construction of electrical and communications facilities. The levels of output in most other sectors were generally on an upswing in the early 2000s, and especially during the two years between 2007 and 2008. During this brief period, the Japanese economy was generally enjoying a buoyant recovery through exports into the global bubble economy. Then the Lehman Shock smashed Japan's growth spurt, not to mention the rest of the global economy.

The collective conundrum since the Lehman Shock and its aftermath has been how to restore growth. Round after round of stimulus spending against a backdrop of virtually zero interest rates has sought to ignite a sustainable recovery with negligible results in both the Japanese and U.S. economies among others. Abenomics and its arrows of monetary and fiscal stimulus, aimed at just about anything that moves, is perhaps the biggest blast of all, and among the least promising.

The MIC data suggest there is a sustainable alternative: that a strategic focus on ICT can help Japan and other countries grow by consuming less and reducing greenhouse gases. The data also demonstrate, for those worried about "bang for the buck," that investment in ICT has a significantly larger multiplier effect than general investment. The "multiplier effect" refers to the amount of economic activity generated as a result of a given volume of investment. Drawing on a growing body of work suggesting that investment in software and other such "intangibles" (as opposed to such "tangibles" as plant and equipment) is very productive,[4] the MIC project thatthe multiplier effect of ICT investment in 2015 may be as high as 1.98 in contrast with 1.19 for general investment.

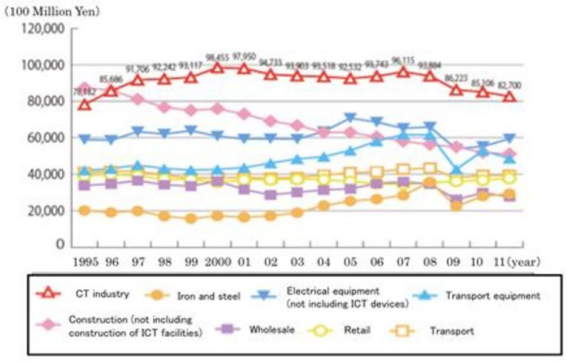

Figure 2: Trend in nominal market sizes of major industries (based on nominal domestic production, 1995-2011)

At the same time, the sensors that are the core element of ICT are getting smaller, more efficient and cheaper. The MIC reviews the miniaturization, reduced power consumption and cost cuts that have already been achieved.For example, in 2000 the surface area of a chip was roughly 10 mm^2 whereas in 2010 that had declined to between 2 to 3 mm^2. By 2020, the size is expected to decline to between 1 and 2 mm^2. In 2000, power consumption per sensor was roughly .01 mW, but by 2010 power consumption had halved to 0.05 mW, and is expected to decline further. Moreover, the average price of a sensor in the year 2000 was just over three US dollars, or about YEN 300 (using a YEN/USD exchange rate of 100). But by 2010, this cost had declined to $.70, or roughly YEN 70. Costs are expected to fall further, leading to roughly $.50 per sensor in 2020, or YEN 50 per sensor. Total global production of sensors in 2000 was 35 million, a number that had expanded to 771 million in 2010. By 2020, this figure is expected to exceed 2.5 billion.

The MIC data also reveal that the volume of data flows within Japan have increased 5.5 times over the seven years between 2005 and

2012. In 2005, the volume of data was 424,306 Terabytes (TB) whereas in 2012 that had increased to 2,217,195 TB. By 2020, Japan's volume of data flows is expected to increase at least 300 times over the levels recorded in 2005. One concrete example of what this growth represents in terms of economic activity within Japan is seen in the domestic cloud service market. Between 2010 and 2016, this market is expected to increase by eight-fold, going from YEN 360 billion to YEN 2.81 trillion. Another example is seen in Japan's smart phone market. This market is expected to grow by 10 times during the seven years between 2011 and 2018, increasing from 9.5 million units to just over 938 million. As a share of the overall mobile phone market, smart phones are expected to increase from the 2011 level of 8.8% to 73.2% by 2018. This would be an eight-fold expansion over the seven-year period.

This data flow is not simply banal chatter and game-playing on smart phones. The MIC provide empirical evidence that the diffusion of ICT, still in its infancy, has already contributed to increasing the Japanese economy's productivity as well as dematerializing it.[5] For example, ICT-enabled preventative maintenance on roads and other transport infrastructure extended the lifetimes of various infrastructures to the extent that total cost reductions of YEN 270 billion were achieved. These savings were roughly 48% of the YEN 570 billion investment in bridges in 2009. Another example is the use of ICT to reduce traffic jams, which led to a YEN 1.16 trillion savings in fuel costs. That sum is equivalent to the fuel costs of over 10 million cars. ICT-enabled preventive maintenance also appears to have had a pronounced effect on down time due to equipment failures in the manufacturing sector. The MIC calculates the effect as a reduction in personnel costs of just under YEN 4.74 trillion. Yet another example offered by the MIC is the use of ICT to maximize the performance of air-conditioners in the business sector. This goal has been especially important in the wake of the March 11, 2011 disasters placing greater pressures on the power network. Total savings in this area were just under YEN 52 billion, representing 65,000 industrial-use air conditioners.

The MIC data also show that the deployment of ICT has helped cut healthcare costs in several test-bed projects. One case is the Niigata Prefecture city of Mitsuke, selected as a "smart wellness" test project in January 2012. This is part of the special zones initiatives. Mitsuke's total population as of October 1, 2013 was 42,034, with 25.6% being over 65 (versus a national level of 23%). The city's ICT project recorded a significant cost gap between areas that deployed ICT, via personal devices[6] as well as visualization of all aspects of patient care, and those that did not. Over three years, the gap was a significant difference of YEN 104,234 per person. Moreover, measurements of bodily strength indicated that the participants made gains in that area as well.

Ageing is prominent among Japan's reasons for becoming more proactive about deploying ICT infrastructure. In 2010, 23% of Japan's 128 million population was over 65; the figure is expected to increase to 32% of 117 million total population by 2030. And projections for 2050 suggest the total population will decline further to 97.1 million people, of which 39% will be elderly.

A massive increase in productivity and cost efficiency is imperative because the working population will decline from the 2012 total of 66.28 million people to 61.8 million people by 2030, a reduction of 4.5 million workers. If current trends continue, Social Security expenditures will greatly increase over those years. The costs include pensions, health care, elderly care and childcare, and totaled YEN 108.1 trillion in 2011. By 2015 these costs are expected to swell to YEN 121.9 trillion, and then grow further to YEN 135.5 trillion by 2020. In 2025, total Social Security costs are

expected to swell to over ¥150 trillion. But given the background of the declining population and number of workers, supporting this kind of expenditure will be difficult without some kind of sustainable growth engine in the economy.

The ICT-Growth Strategy

Like many other governments in the developed and developing world, the Japanese government has had some form of "ICT growth strategy" for well over a decade. Japan began its "e-Japan strategy" in January 2001. The goal was to make Japan the world's most advanced IT nation by 2005. In January 2006 that strategy was refashioned as an IT plan that emphasized making the benefits of IT available to anyone at any time and at any place within the country. In July 2009, the "I-Japan strategy 2015," was announced. This strategy aimed at realizing a digital focused social economy centered on the citizens.

A separate stream of initiatives also emerged from the MIC. From December 2004, the MIC began implementing its "u-Japan Strategy," which aimed at making a ubiquitous society by 2010. The ministry also adopted a program of "xICT Vision" in July 2008, which aimed at deepening the interconnectedness of all industries and regions through ICT. These initial programmes and their successor initiatives have led up to the present strategy. The June 2013 "Japan Revival Strategy," melds the MIC and general government initiatives into a comprehensive growth strategy for the entire public sector.

These aims were articulated in the Abe Cabinet's June 14 declaration that its strategy would aim at "creating the world's most advanced IT state." Key points in this declaration include deploying ICT to help break through the various barriers and problems confronting the Japanese society and economy. Among the areas to be addressed through ICT were the problems of declining birth rates and accelerating costs for Social Security as well as large-scale disasters and other problems. A keystone of the growth strategy was also the use of IT in its engine for growth.

In order to realize "the world's most IT activist society," special stress was placed on having the cabinet's "IT Strategic Headquarters"[7] act as a "CIO" (or "Chief Investment Officer") in order to break down the vertical administration, or silos, separating the ministries and thus enhance the coordination of the strategy. Another major part of this strategy is to remove impediments to diffusion of ICT that exist within the regulatory system and elsewhere. An additional point of emphasis is to deploy models of success in order to encourage diffusion.

Big Data and the Global Challenge

The MIC presentation stresses the role of ICT and so-called "big data" (e.g., massive flows of information from sensors monitoring ambient conditions) in alleviating a host of contemporary crises. In a rough sketch of how fraught are our circumstances, the MIC note that the number of people living in water-stressed areas is expected to quintuple over the 45 years between 2005 and 2050. They also point out that between 2005 and 2030, emissions of carbon dioxide are expected to increase by 160%. The data also suggest that the consumption of primary energy, such as through oil and coal, is slated to climb 140% over the 20 years between 2010 and 2030. In addition, between 2010 and 2050, the consumption of minerals is likely to exceed present estimates of total reserves.

The key driver for all of these unsustainable trends is that the world's urban population is in the midst of an explosion. In 2011, half the global population of 7 billion people lived in cities. This share is expected to increase even more rapidly than the global population itself over the coming years. Thus by 2025, the total global population estimate of 8 billion is

projected to include 4.6 billion people living in cities.

The MIC detail a variety of applications of ICT and big data that can help alleviate these crises as well as make urban centres more resilient. One example, shown in figure 3, is the use of ICT sensors to monitor the flow of water and other fluid in pipes. Incredibly, the Abe cabinet, confronted with the world's worst problem of radiated water at Fukushima Daiichi, has not seized this opportunity to help resolve the crisis while also accelerating and showcasing Japanese ICT technology. The MIC's figure represents a proposed joint project between Japan's NEC and Swiss "Intelligent Water Loss Management" specialist firm, Gutermann.[8] Gutermann already produces a "ZoneScan Alpha" system that has been deployed in a number of smart cities globally to automatically notify them "of every leak in the monitored pipe network and at the same time give…exact locations of every leak."[9]

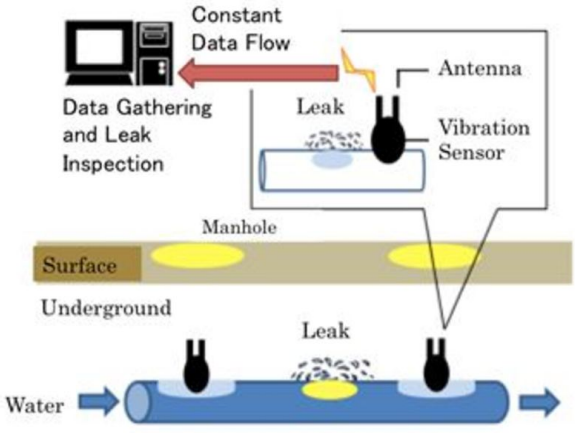

Figure 3: Monitoring Water Leaks With ICT

Recall that one of the key problems at Fukushima Daiichi is the daily flow of 1000 tonnes of groundwater from the nearby hills, and the lack of information on where it is going as well as its levels of contamination.[10] Abe was content to lie to the International Olympic Committee that everything was "under control" as well as assent to funding the construction of an "ice wall" a couple of years from now to control radioactive water at Fukushima. But as figure 4 shows, ICT and big data can be used to monitor water flows through aquifers and other natural sources of flow below and above ground. The MIC note that the use of ICT to monitor surface and groundwater flows is under study by the Japan RiverFront Research Center.[11] Yet this kind of technology is already being deployed by a variety of firms,[12] and it seems peculiar that Fukushima Daiichi is not apparently being used as – so to speak - the mother of all test-beds.

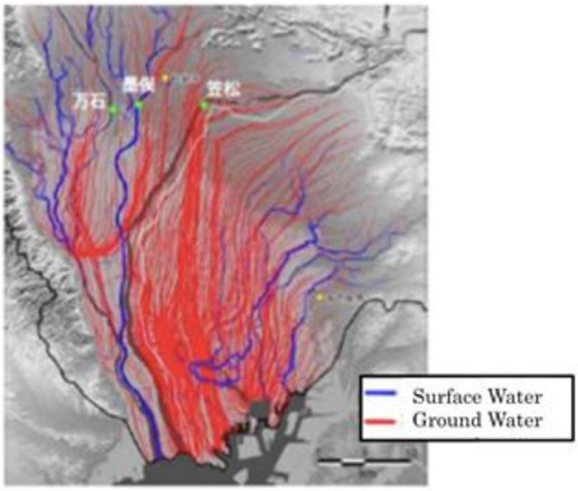

Figure 4: Monitoring Ground and Surface Water With ICT

Conclusion: This Time Try a Target, Mr Abe

In this overview of the MIC's presentation, we have seen that the fiscal multiplier of the projects greatly exceeds alternatives. ICT also makes citizens and their communities more resilient and less resource-intensive. Reducing traffic jams and health-care costs would appear

to be just the beginning. ICT also makes nearly all urban infrastructures more resilient. As GE and other first-mover firms argue, when you can monitor something, you can manage it. The evidence of payoffs is profound, and MIC's work helps show that no nation has more reasons to do this than Japan.

Given these opportunities, one would think that the cabinet is not only fully and vocally behind this initiative, but also keen to announce it to the Japanese people and the world. Yet Abe himself has not even mentioned, let alone stressed, using e.g. water-monitoring technology at Fukushima Daiichi. This is mystifying. Not only is Fukushima Daiichi an enormous threat as well as opportunity for accelerated technological advance. But Japan's overseas infrastructure export drive centres on developing advanced systems to monitor groundwater flows, leaks from pipes, and the like.

So it is imperative that Japan's ICT strategy be properly coordinated, making it the focus of an already unprecedented mobilization of monetary and fiscal mechanisms that lack no real target. Japan itself desperately needs the diffusion of ICT, and it needs its distracted Prime Minister and cabinet to take a serious interest in order to accelerate that. The June 14 cabinet announcement stressed the role of high-level coordination in order to break through silos in the bureaucracy, business, and other sectors. Some Japanese specialists were overjoyed that the cabinet announced ICT as core to growth, and assumed that meant that there would be action. But the cabinet's "IT Strategic Headquarters" did not get around to having a serious meeting until October 3 and there is still no evidence that it has a grip on what is to be done.

The ICT strategy should be the center of preparations for the 2020 Olympics, further accelerating Japanese initiatives for a green and safe economy. The payoff would not only be a global showcase for Japanese technological prowess. It could also help make global city regions more resilient to accelerating climate threats and resource crises.

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Recommended citation: Andrew DeWit, "'Data Will Change ICT,' But Will it Change the Abe Regime?" The Asia-Pacific Journal, Vol. 11, Issue 41, No. 4, October 14, 2013.

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[1] The presentation was in Japanese, and there appears as yet to be no English version. The talk was divided into 5 separate sections. The two sections pertinent to this article are here and here.

[2] See for example the collaboration between the city, Fujitsu and Tohoku Electric Power as described in "Fujitsu, Aizu Wakamatsu City and Tohoku Electric Power Launch Smart Community Project in Japan's Aizu Wakamatsu Region" Fujitsu Press Release, May 1, 2013.

[3] On the difference between nominal versus real values, see the explanation here.

[4] A concise explanation of this key issue, in relation to the UK economy, can be found at Jonathan Haskel's blog article, "Can Intangible Investment Explain the UK Productivity Puzzle?" February 8, 2013. A study of its application to the Japanese economy was done by Miyagawa Tsutomo and Hisa Shoichi, Measurement of Intangible Investment by Industry and Economic Growth in Japan," Policy Research Institute, Ministry of Finance, Japan, Public Policy Review, Vol.9, No2, March 2013.

Another example is seen in James Elles "ICT investment: the significant example of South Korea," April 19, 2013.

[5] Indeed, chatting or playing a game on an i-phone or other smart phone is in itself dematerialization, to the extent that it replaces driving a 2-ton car or some other more resource-intensive activity.

[6] The equipment includes devices that monitor the individual's amount of activity, such as steps taken during the day.

[7] The IT Strategic Headquarters' English website is here.

[8] Gutermann's English-language home page is here.

[9] See the description of the network here.

[10] On this, see Andrew DeWit and Christopher Hobson, "Abe at Ground Zero: the consequences of inaction at Fukushima Daiichi," The Asia-Pacific Journal, The Asia-Pacific Journal, Volume 11, Issue 35, No. 1, September 2, 2013.

[11] The Center's English-language home page is here.

[12] For example, Telog Instruments Inc of New York.