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Japanese PM Abe Shinzo's win in the July 21 Upper House elections may have given him and his LDP party three full years to reform the Japanese economy. But as some analysts warn, there is still no key theme in Abe's plans for reform and he has already started talking about constitutional revision.[1] All governments have limited capacity to make significant change, so - as in business and indeed life in general - it is essential to choose and focus. This short article argues that Abe would be well advised to follow the advice of a succession of recent white papers and reports from within his own party and government, and focus on the enabling role of information and computer technology (ICT) in energy, health and a range of other services and markets. Much of the Japanese elite want to transform the country into a national version of "industrial internet" General Electric, and are moving to implement those aims. But Abe could derail these efforts with his divisive and dangerous constitutional and historical obsessions.[2]

The ICT Opportunity

As we know from markets for mobile devices and the incredible resurrection of Apple, ICT is an area where it pays to be competitive through innovation. Moreover, ICT competitiveness appears likely to pay off very well indeed over the coming years and decades. One crucial reason is that ICT sensors and data processing are becoming increasingly cheap, as described in a concise June 2013 overview by McKinsey and Company.[3] For energy, this reduction in the costs of gathering, transmitting, and processing information on such system parameters as temperature, vibration, and the like have led to significant efficiency and reliability gains in jet engines, wind turbines, locomotives and other systems. Those results mean large savings by customers, and a great deal of money earned by vendors who innovate disruptive business models. Setting aside the good news for sustainability,[4] that bottom-line fact is one reason General Electric (GE) announced, very publicly on June 18, that it was going to be an "industrial internet" firm as much as a maker of things.[5] GE is a prominent global firm, the biggest of the manufacturing conglomerates, with sales in over 190 countries. So its persuasive depiction of the value of the "industrial internet" has caught not only specialist attention, but also the scrutiny of a lengthy but very readable piece in the New York Times (available online).[6]

GE's in-house analysis of the benefits from the industrial internet suggests that it could raise average incomes in the U.S. alone by 25 to 40 percent over the next two decades and increase productivity to levels not seen since the late 1990s. In terms of global income gains, the GE study (which is also online and very readable) indicates that the worldwide effect could be USD 10 to 15 trillion over the same period.[7] GE's work indicates that merely a 1% level of increased efficiency through "sensor-enabled industrial equipment" represents a USD 66 billion saving for its energy customers, USD 30 billion for aviation, and USD 63 billion in health care.

GE is perhaps the most ambitious and creative manufacturer in the swelling ICT space, with its "Datalandia"[8] here and other imaginative efforts to help the broader public understand how rapidly and broad-based the industrial internet is evolving. But GE is hardly the only firm at work on branding and positioning itself in the "industrial internet," "big data," the "Internet of Things," "Machine to Machine" (M2M), and related realms. Japan's Fujitsu and Toshiba are also prominent in the field, as are IBM, Cisco Systems, Samsung, Phillips, Siemens, and other heavyweights as well as an uncountable list of smaller innovators, many of them key vendors of crucial systems that remain relatively unknown or are just emerging. These key vendors are providing innovative M2M applications that will set the groundwork for future M2M devices.

Some observers challenge the estimates of GE and others, especially Cisco's declaration that the "Internet of Everything" will deliver USD 14.4 trillion of economic value by 2012 (with Japan standing to gain USD 761 billion).[9] But there is no question that an ICT-centred revolution is rapidly unfolding, and that it spans energy, healthcare, and myriad other sectors of the economy. It is also building new economic activity, even as it displaces other activity via reduced material, financial and human resource requirements. Given that reality, what Japan does is pertinent not only to its own economic competitiveness, but also perhaps to the pace at which an increasingly desperate global economy deploys smart cities, renewable energy, radical efficiency and other desirable ICT-dependent change.

Japan's ICT Challenge

ICT is a huge opportunity, but despite its technological strengths, Japan has to run hard to catch up to the leaders. Perhaps the most astute observer of Japan's ICT policy and its political economy aspects is Steven Vogel, Professor of Political Science at the University of California Berkeley. In a forthcoming book chapter, "Japan's Information Technology Challenge,"[10] he presents a detailed overview of Japan's ICT policy failures. He marshals a litany of unpleasant truths, such as the fact that Japan's labour productivity is 20th of 30 OECD countries and its per-capita GDP plummeted from 3rd in 2000 to 23rd in 2008. He also notes that a Ministry of Economy, Trade and Industry (METI) study from 2010 revealed that 90 of 170 respondent firms were considering moving some or all of their operations offshore, with some "even contemplating a shift of development functions (30 companies), research functions (8 companies), or headquarters functions (4 companies)."

Vogel also lists a number of stumbling blocks that hinder Japanese firms in the ICT sector. These can perhaps be best summed up as an institutionalized lack of flexibility in the face of an economic environment that is increasingly interactive (indeed, "user-driven") and global. But at the same time, he notes that Japan still possesses core strengths in its "capable bureaucracy, strong government-industry ties, and close collaboration among firms, suppliers, banks, and workers." Vogel also points to the March 11, 2011 disaster and its repercussions as a possible stimulus for improved performance.

Vogel's work is strongly confirmed by recent white papers and reports on ICT from Japan's Ministry of Internal Affairs and Communications (MIC),[11] its Cabinet Office,[12] the LDP's ICT Growth Strategy Commission[13] and a range of other assessments. These reports all highlight the significance of ICT as well

as Japan's declining performance in that critical field. Another theme shared by many of these analyses is that Japan cannot afford to muddle along in this area because it faces very high costs of managing over YEN 700 in infrastructure stock that - like the society itself - is ageing and requiring ever more costly maintenance. ICT is very realistically depicted as a means for reducing a range of costs while at the same time opening up opportunities. For example, the LDP Commission's ICT report very sensibly calls for putting "ICT in concrete" as well as diffusing the renewable and smart model being developed in the devastated Tohoku (Northeast) region across the nation.[14]

ICT is also a large base from which to build. As we can see from figure 1, Japan's ICT industry in 2010 was worth \85.4 trillion worth of a total \928.9 trillion in nominal market size. In other words, the ICT industry represented 9.2% of the economy, making it much larger than construction, iron and steel, and other sectors. Yet the ICT sector as a whole has not increased markedly from its 1995 level of just over \78 trillion, in step with an economy that has not grown significantly since the mid-1990s.

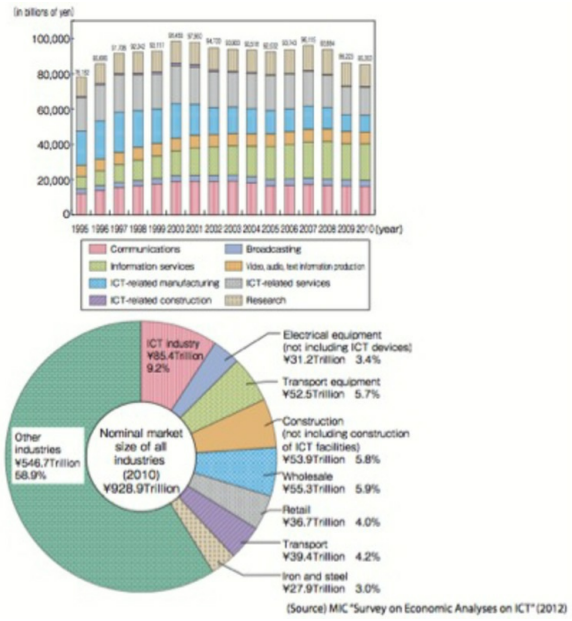

Figure 1 - Nominal market sizes of major industries (based on nominal domestic production, 2010)[15]

The Japanese economy has among the world's least expensive and fastest broadband services. This is a potential advantage in the competition. But the diffusion of advanced broadband services within Japan's economy is surprisingly low relative to the United States and Germany, two salient competitors. As the Japanese Cabinet Office's July 23 Annual Report on Economic and Fiscal Affairs illustrates in the figure below, the diffusion of ICT in Japanese manufacturing as a whole as well as in several core business sectors is notably behind that of the Germans and the Americans. The figures measure the amount of ICT capital equipment per-unit labor input, with the year 1995 representing "1" for each of the cases. The Japanese fare rather poorly in comparison with the Americans and the Germans across all industries. In manufacturing, the Japanese and the Germans are nearly neck and neck, with the Americans considerably ahead. But in wholesale and retail, the Japanese are far behind the Germans and the Americans. In the information and communication sector per se the Japanese and the Germans both appear relatively stagnant, whereas the Americans are accelerating their deployment of ICT. In health and welfare, the Japanese profile is similar to that of wholesale and retail, again being considerably behind both the Germans and the Americans. And in farms, forestry and fisheries, the Japanese are not only behind the Americans and the Germans, but the level of ICT diffusion appears to be declining.

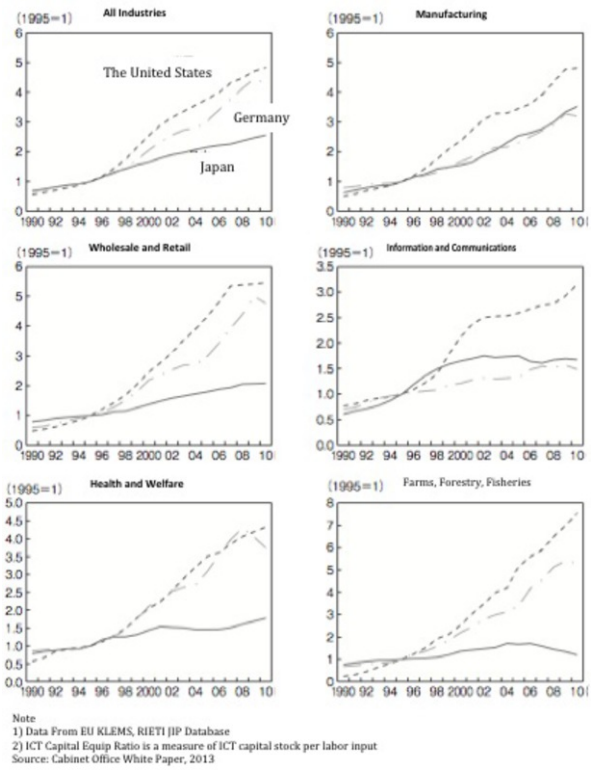

Figure 2 - Diffusion of ICT Across Industries in Japan, Germany and the US[16]

Will Abe

Focus on Productive Abenomics?

Seen against the backdrop of GE and other firms' analyses and achievements, these figures suggest that further diffusion of ICT could help boost Japan's productivity as well as foster economic opportunity. These outcomes would potentially go far in helping to achieve the goals of the so-called "Abenomics" effort.

This Abe programme seeks to revitalize the Japanese economy through an unprecedented mobilization of the country's financial and fiscal mechanisms, but with an as yet unclear agenda on where these fiscal and financial resources should flow. Although many observers believe that such crucial decisions should be left to the private market through deregulation, the MIC, the LDP ICT Strategy Commission, and the Cabinet Office's reports suggest that a more strategic orientation is in order if Japan is to break out of its stagnation. Japan is gifted with very fast and cheap broadband, but has not diffused it to the extent that the Americans and the Germans have. It therefore has an opportunity to undertake very productive investment and at the same time innovate new technologies and business models.

Vogel rightly suggests that the March 11, 2011 crisis and its aftershocks might galvanize smart action on ICT. The Ministry of Interior and Communications (MIC), in cooperation with other agencies that have significant presence in local areas (such as the Ministries of Environment, Agriculture,Forest and Fisheries, Land Infrastructure and Transport, Education, and so on), and with the involvement of local governments (which the MIC oversees), is eagerly supportive of an ICT-centered growth strategy. Moreover, it has already coordinated a great deal of investment in that area, both on its own and in

collaboration with other agencies. Moreover, these agencies are backed up by the LDP's ICT Strategy Commission. And the core of this ICT-centered growth initiative is bolstering local resilience through local production-local consumption, in energy as well as food and other essential resources and commodities.

Japan is, in short, undertaking promising investment in smart and green sectors against a backdrop of accelerating opportunity. Japan is also guided by many of the "resilience" concerns that are emerging as concerns in virtually every country. All countries confront the increasingly palpable effects of the energy-water-food nexus and other climate-related crises, but most generally find it difficult to mobilize the combination of public agency and smart capital to cope with them. But Japan may be advantaged through a confluence of being behind in ICT while also being ahead of most in the awareness of the need for resilience. Working with partners in the Asian region especially, Japan could potentially become as promising and focused on ICT, as a national economy, as GE is among firms.

Abe is certainly not going to interfere in the MIC and other ministries' ICT budgets and their allied smart city, smart grid, distributed generation and other projects. He in fact sits on committees related to these initiatives. Abe is perhaps unlikely to spearhead these ICT endeavors, by for example spending a big part of his political capital on deregulating the power sector. He has also been rather quiet about the ICT opportunity compared to emphasizing overseas sales of nuclear reactors and services. But those shortcomings may prove to be small beer. Perhaps the greatest risk is that Abe turns to the constitution-related politics that are his singular obsession. Constitutional politics is a powder keg in Japan itself as well as the region as a whole. And setting it off would certainly undermine Japan's capacity to innovate in ICT, particularly in cooperation with its neighbours. It would also threaten to turn Abenomics from a targeted dash for smart growth into a fiasco, perhaps followed by a fiscal catastrophe that sends shock waves around the world.

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Notes

[1] See, for example, the post-election political risk analysis that warns Abe "may well conclude that he has a free hand to focus on constitutional reform," in "Abe Reloaded: Now The Hard Work Begins," Business Monitor Online, July 22, 2013

[2] The portents are not good. As the July 27 Japan Times reported, Abe "avoided the topic of constitutional revision and other right-leaning policies during the Upper House election campaign. Now that the election is over, Abe appears eager to put the topic back on the table." See "Abe tells Philippine leader of tilt towards more robust military," Japan Times, July 27, 2013. 2013: here

[3] See Markus Loffer and Andreas Tschiesner, "The Internet of Things and the future of manufacturing," McKinsey Insights, June 2013: here

[4] The core enabling aspect of ICT seems likely to determine whether we can crunch material consumption and diffuse renewable energy faster than ravages via population increases, "extreme weather," and a water-food-energy nexus that undermines our collective capacity to endure let alone thrive. It is, for example, key to the "green growth agenda" described by Heinrich Boll Foundation executive board member Ralf Fücks in the summary of his new book (Intelligentwachsen: Die Grune Revolution) "Europe can do better – a green growth agenda," May 31, 2013: here

[5] The occasion was the unveiling of "the first big data and analytics platform robust enough to manage the data produced by large-scale, industrial machines in the cloud." See "GE Moves Machines to the Cloud," Wall Street Journal, June 18, 2013: here

[6] See Quentin Hardy, "G.E. Makes the Machine, and Then Listens to It," June 20, 2013. The online version carries the same title and byline, but is dated June 19: here

[7] See "New Industrial Internet Report From GE Finds That Combination of Networks Could Add $10 to $15 Trillion to Global GDP," GE Reports, November 26, 2012: here

[8] GE used Germany's Miniatur Wunderland, the world's largest "miniature town," to depict big data solutions in daily life but in a rather unorthodox way. The

results are impressive: here

[9] See Art Wittman, "Here Comes the Internet of Things," Information Week, July 22, 2013: here The article is a critical reaction to estimates that it regards as hype. Its most powerful claim is that sensor installation costs are a barrier, but in fact fails to note that GE already puts no fewer than 20,000 sensors on its "Brilliant" series of wind turbines.

[10] This excellent chapter is to appear in Dan Breznits and John Zysman, eds, *Can Wealthy Nations Stay Rich?* (Oxford, Oxford University Press, forthcoming), and is available online: here

[11] The MIC White Paper was released (in Japanese) on July 16, 2013 and emphasizes that "smart ICT" is core to revitalizing the Japanese economy: here

[12] The Cabinet Office's Annual Report on the Economy and Finances is available (in Japanese) at: here

[13] The Committee's May 23 report is available (in Japanese) here: here

[14] See page 16 (in Japanese) of the Commission's May 21, 2013 report "Digital Japan 2013: Taking Back Japan Through ICT": here

[15] The chart is from the tentative English version (a revision is expected in September) of the MIC White Paper on ICT: here

[16] The figures are from page 425 of the report: here