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How to successfully promote ICT usage: A comparative analysis of Denmark and Japan

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ABSTRACT

The paper presents a comparative analysis of two advanced ICT nations, Japan and Denmark. While Japan is very advanced with respect to its telecommunications infrastructure, Denmark has come further than Japan regarding the use of ICT infrastructures. This paper compares Denmark, a leader in ICT usage, and Japan, which lags in that regard, analyzes differences in institutions, technologies, and services offered, and examines factors contributing to the success of Denmark in promoting ICT usage from a Japanese perspective. Strong governmental leadership, and common techno-infrastructure such as personal ID and digital signature that serve different systems, and user-orientation of service design are the characteristics of Danish efforts absent in Japan.

1. Introduction

Denmark and Japan are two of the world's most advanced ICT nations. According to the Networked Readiness Index, which is published by the World Economic Forum (WEF), Denmark ranked first for three consecutive years from 2007 through 2009, ranked third in 2010, seventh in 2011, and ranks fourth in 2012 (WEF, 2007, 2008, 2009, 2010, 2011, 2012). Japan, in contrast, in spite of being one of the world's top countries possessing advanced infrastructure with ultra-high-speed broadband networks like FTTH (Fiber-To-The-Home), has been facing the long-term issue that little progress has been made in ICT usage in government, health care, and education. Japan's struggle continues in 2012: the country ranks eight-teen in terms of the WEF Index.

It is increasingly recognized around the world that an increase in a country's ICT competitiveness is positively correlated with its economic growth or international competitiveness. After the Financial Crisis of 2008, various countries in the world, such as the US, UK, France, and Australia, announced their national IT strategies one after another as part of measures to boost the economy, which included ambitious plans for broadband investment (Henten and Falch, 2010).

As WEF points out, however, broadband infrastructure is but one factor; an advanced infrastructure is not in itself sufficient to help increase the ICT competitiveness. Rather, the effectiveness of such infrastructure emerges only when government, businesses, and individuals utilize the ICT infrastructure that it leads to general competitiveness.

From this standpoint, if we focus on the use of ICT, we find a clear difference between Denmark and Japan. *The 2009 White Paper on Information and Telecommunications*, which was prepared by Japan's Ministry of Internal Affairs and Communications (MIC), conducted a comparative analysis of seven advanced countries in terms of ICT usage, and considered that

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Table 1
A Comparison of Infrastructure and ICT Usage between Denmark and Japan.[a]

Category	Subcategory	Denmark (ranking)		Japan (ranking)		Source
Infrastructure	FTTH/B availability (%)	14	4	86.5	1	OECD (2009a)
	Fiber/LAN subscriptions per 100 inhabitants (%)	5	6	16.4	2	OECD (2011b)
	Fiber connections per total broadband (%)	13.5	7	60.8	1	OECD (2011b)
	Fastest advertised broadband speeds, all connections	112 Mbps	15	1Gbps	2	OECD (2011b)
	Average advertised broadband download speed	37 Mbps	13	156 Mbps	1	OECD (2011b)
	Median price per 1Mbps (USD, PPP)	1.67	6	1.41	3	OECD (2011b)
	3G coverage (%)	97	6	100	1	OECD (2009a)
	Fixed broadband penetration subscribers per 100 inhabitants (%)	37.9	3	27.4	16	OECD (2011b)
	Mobile wireless broadband subscriptions per 100 inhabitants (%)	81.5	5	82.4	4	OECD (2011b)
ICT usage	Households with broadband access (%)	80.1	5	63.4	19	OECD (2011b)
	WEF Networked Readiness Index 2012, Usage subindex (ranking)	-	3	-	8	WEF (2012)
	Individual use of eGovernment portal (%)	–	72	–	8	Eurostat (2011), Cabinet Secretariat (2011)
	Online availability of government services (%, individuals)	75	–	52	–	Eurostat (2010), Cabinet
	Online availability of government services (%, businesses)	100	–		–	Secretariat (2010a)
	Online availability of medical bills in the health care field (%)	100	–	27.1	–	Digital Health, MIC (2010a)
	Internet access in schools (ranking)	–	8	–	39	WEF (2012)
	Public Certification Service for Individuals (%)	24	–	1	–	MIC (2010b)
Basic data	Population	5.45		120		Unit: millions
	GDP per capita (ranking)	55,986	6	42,783	17	IMF (2010)

[a] These statistics are of the latest available at the time of the submission.

Denmark is the opposite of Japan and has a system that Japan should pursue. As discussed in *The White Paper*, in Denmark ICT usage is advanced, the degree of users' uneasiness toward ICT usage is low, and the country has characteristics that are opposite to those of Japan. It does not, however, mention reasons for the difference between the two countries.

Some may suggest that there are many differences between Denmark and Japan, for instance, in terms of political system. Denmark is a social democratic country (a welfare state), having a rich social security system. Educational and medical services are provided for free in principle by the government. Citizens in exchange face a heavy tax burden. In contrast, Japanese government is smaller in scope. Unlike Denmark, education and social security services are provided by a variety of entities – national, local, and private. Thus, the share of labor force in the public sector is 31.5% in Denmark, and only 7.9% in Japan (OECD, 2011a). Despite the difference, as mentioned below, the successs of eGovernment effort is still considered in Japan an important step for the ICT usage in the society at large. Furthermore, WEF and a number of Japanese policy documents share a view that advanced ICT use is a way to achieve an economic growth (MIC, 2009).

This paper compares Denmark, a leader in ICT usage, and Japan, which lags in that regard, to identify primary factors contributing to the success of Denmark in promoting governmental ICT usage from a Japanese perspective. The paper focuses on eGovernment among many ICT uses, because eGovernment efforts are expected to promote the usage of ICTs not only in government, but also in other areas, including educational and medical services by providing basic ICT infrastructure. This is most evident in cases such as digital signature and national ID systems, which if successfully introduced by the government, will provide great help to private sector transactions. One may still wonder, if Japan is not already ahead of the rest of the world in terms of advanced ICT usage. It is true that Japan shows some of the remarkable consumer technologies and gadgets. Yet it is also a common view among the policy circles that ICT usage in businesses is not effective in raising productivity (MIC, 2008; Shinozaki and Yamamoto, 2009), and the levels of ICT use in educational and medical sectors remain still low (MIC, 2009; see also, Table 1 below).

More specifically, the paper analyzes differences in institutions, technologies, and services offered. These analyses are based on interviews the author conducted with government officials and relevant academics since 2009. Additional consideration is given to social backgrounds that characterize the two countries. Section 1 presents the current status of both countries' infrastructure and ICT usage. Based on interviews conducted by the author mainly with Danish government officials, Section 2 discusses the characteristics of Denmark in terms of institutional aspects, technologies contributing to societal infrastructure, and the development of user-oriented services. The characteristics of Japan are discussed in a comparable manner in Section 3. Section 4 then examines both countries' social and cultural background related to ICT usage, and Section 5 concludes the paper.

2. Current Situation in Denmark and Japan: a Comparison of Infrastructure and ICT usage

Japan's broadband infrastructure is the best in the world in terms of speed, price, and quality. With regard to FTTH/B (Fiber-To-The-Home/Building) household coverage, Japan ranks first with 86.5% already in the beginning of 2008, distantly followed by South Korea which is ranked second with 67% by end 2008 (OECD, 2009a). In the same period, Denmark was at 14%. The network lines in Japan are highly stable with their maximum speed being 1Gbps, and the price per 1 Mbps is among