

Japan: impressions of an innovative land



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Dorette Corbey



At the invitation of the Netherlands Embassy in Tokyo, on 27 September 2014 I set off for a working visit to Japan. I had three questions to which I was hoping to find answers: What can the Netherlands learn from Japan? Conversely, what does the Netherlands have to offer Japan? And finally, what opportunities are there in Japan for Dutch research institutes and businesses? Clearly, it would not be possible to obtain comprehensive answers to these questions on such a short visit, but I was hoping that the many discussions I would be having might provide some indications. This report discusses the challenges facing Japan, its science and technology policy, day-to-day practice in Japanese businesses and universities, and the various tensions in policy.

Turning point

En route to Japan I read 'The Samurai's Garden', a novel by Gail Tsukitama set in the 1930s against the background of the Sino-Japanese war. Nothing in this narrative is quite what it seems. A quiet coastal village turns out to be the gateway to a mountain village where lepers live in total isolation, help each other and create the most wonderful gardens. The beauty of the garden as a metaphor for life, for the bonds between people. But nothing is what it seems.

On arrival in Tokyo, I learn that big changes are needed in Japanese society. I read it in books about Japan,¹ in the English-language newspapers. I also hear it in the conversations I have.² People talk about Japan's remarkable resilience. Major changes are taking place in the economy, the population is ageing, social changes are happening. Earthquakes and a recent volcanic eruption demand constant alertness. Japan has to do deal with these changes,, according to those I spoke to.

The need for change is not immediately apparent when strolling through Tokyo. It's a perfectly organised city, with good public transport, good amenities. You hear crickets chirping almost everywhere you go in the city. Beautiful, well cared for parks, oases of rest in a metropolis which does not give the impression of

¹ Keiko Hirata and Mark Warschauer: Japan. The Paradox of Harmony, Yale University Press, 2014. David Pilling: Bending Adversity. Japan and the art of survival. Penguin Books, 2014. Christopher Goto-Jones: Modern Japan, A very Short Introduction. Oxford University Press, 2009.

² I held discussions with Radinck van Vollenhoven (Ambassador) Rob Stroeks, Cincy Heijdra and Paul op den Brouw (Embassy staff), Tom Kuczynski and Leonidas Karapiperis (EU Japan delegation), Jos van Ruyven (DSM Japan), Eiji Tanimura (MAFF), Takakashi Hayashi, Masayasu Asai, Daisuke Kunii (Policy Research Institute), Yoichiro Matsumoto (Tokyo University) and Yuko Harayama (CSTI). I also spoke to representatives of Finland, Germany, the UK, Austria and Italy.

bursting at the seams. Men wear dark suits with white shirts and ties, except for the odd construction worker with their ornate wide trousers. Women are slightly more colourful, often carrying smartphones, sometimes with a child. There is no noise, no major traffic congestion, no pushing and shoving in the Metro. On just about every corner are small stores operated by Family Market, 7 Eleven, Lawson or other chains where you can buy food and basic necessities. Vending machines selling soft drinks and water are everywhere, with small delivery vans from companies such as Japan Beverages keeping them regularly stocked up. But not a tin can or plastic bottle dropped anywhere in the street. There are no visible social problems, no tramps, no homeless people, no addicts. It's almost twenty years since the sarin gas terrorist attack in the Tokyo Metro. There is virtually no unemployment. There are no major ethnic tensions. Some things are different than in Europe; for example, it is forbidden to smoke in the streets, but allowed in restaurants because these are private spaces. There is attention for the environment everywhere. In short, an ideal society, a smart city. I know, nothing is what it seems, but why this urgent need for change?

Energy

First, there is the triple whammy of disasters. There was the Great East Japan earthquake, which claimed many victims and caused extensive damage. The tsunami which followed caused havoc to coastal areas, washing away whole villages and endangering the Fukushima nuclear power plants. The community spirit following the earthquake and the tsunami was impressive, as several people tell me.³ Many volunteers were mobilised to help the affected villages. Within a relatively short time, everything was up and running again, schools were able to reopen, trains and buses were running again. But the nuclear disaster continues to divide Japanese society. There was heavy criticism of the government, which was accused of responding too slowly and too indecisively. But above all, there is division about where to go in the future. Major investments are currently being made in sustainable energy (Japan currently has 10% sustainable energy, the vast majority from hydropower), with a system of feed-in tariffs. Japan has become a major importer of LNG gas. There is potential for solar and wind power, and above all tidal energy because of the strong tidal flows between the various Japanese islands.⁴ There are plans to combine sustainable energy storage with the hydrogen economy.⁵ But all that does not lead to an unambiguous answer to the question of whether Japan

³ See: Pillent, 2014.

⁴ Interview with Rob Stroeks.

⁵ The Japan News.

needs nuclear energy and whether nuclear energy can be 'inherently safe' in a country that is subject to earthquakes and volcanic eruptions.

Population ageing

Second, the people belonging to the post-war baby boom generation, who are now aged around 60, are approaching retirement. This is the generation which rapidly made Japan great in the post-war years, and which proved they possess remarkable resilience. It was the generation that dared to make choices, that brought about impressive economic growth in the 1970s and 80s. In those years, Japan was a factor to be reckoned with. The economic hegemony of the US was challenged – not just by the export figures, but also by the production methods. The American car manufacturer Ford served as a model for conveyor-belt mass production: Fordism. At the end of the 1980s came the new product logic of Toyota: Toyotism, characterised by its just-in-time management, perfect logistics and perfect quality control. Japan and Japanese companies played a leading role in the emerging globalisation of the economy. Together with Europe and the US, Japan would form the triad that led the world economy.⁶ But things turned out differently. The economic crisis that began in the early 1990s ushered in two 'lost decades' for Japan. It says a great deal about this country that it has come through the years of recession relatively unscathed. The generation who helped Japan grow and flourish is now on the point of retreating from the stage – that alone is enough to usher in change.

The social challenge

But is the younger generation so very different? The Japanese are indeed known as a people who work hard, very hard. In fact they work so hard that they often do not have time for a life outside work. At least, that is the case for the men. Women are underrepresented on the labour market, and if they are employed, it is mainly in supporting roles. Fewer and fewer people have permanent positions and if possible, flexible employees work even harder, for less money and less security.⁷ Japanese men are unwilling and unable to marry and start a family: it is no coincidence that Japan is confronted with a rapidly ageing population. The challenge is therefore to structure work differently so that men and women are able to share tasks and start families. That means getting

⁶ Kenichi Ohmae, 'Triad Power: The Coming Shape of Global Competition', 1985.

⁷ Keiko Hirata, Mark Warschauer, 2014, Yale University Press.

more women into the workforce. Another societal challenge is to offer older people a future, a long, healthy and productive life. Ageing forms an important context for research and policy – as well as for marketing. For example, a cosmetics company commissioned research into the effect of cosmetics on health. What did it find? Older women who wear make-up every day exercise their muscles whilst applying it and therefore remain healthy for longer. Helping older people in their daily lives is one of the most important envisaged applications of robot technology. Question to robot: “Where are my keys?” Answer: “On the table, Mr Tanaka; I’ll take you to them.”⁸

Rural depopulation

The fourth reason which necessitates change is the depopulation of the countryside. Young people are moving to the cities; entire villages stand empty. However, the countryside, the way of life, the culture, farming, still all form part of the Japanese national identity. One area where the regional problems are visible is forestry. Around 60% of Japan is covered by forest, much of it planted. “In the run-up to the Second World War, a great deal of timber was harvested for fuel and for the construction industry,” recounts Daisuke Kuni from the Ministry of Agriculture, Forestry and Fisheries’ Policy Research Institute. “After the War, returning soldiers were given the task of planting new forests, often with coniferous species. 60 years later, those trees are mature and have to make way for new plantations.” But who is going to do the work? It is too heavy for older people, especially since most of the trees are on very steep slopes. There is little enthusiasm for the Finnish timber harvesting machines which pluck the trees with long hydraulic arms and cut them into neat, trimmed lengths. For the Japanese, forestry is manual work. Moreover, the price of timber is so low that using machines is barely viable. The solution is sought in incentives to boost the regional economy. More people, more volunteers, more use of timber, for building but also for heating homes.

Innovation!

The government’s answer to these challenges is simple: innovation! Japan wants to be number one in the world in the field of knowledge and innovation. According to Prime Minister Shinzo Abe, this requires a new international orientation. The Olympic Games in Tokyo in 2020 are important here, because

⁸ From: The Japan News, 6 October 2014.

they offer a perfect opportunity to show off Japan's technological prowess to the world. This is the second time that Tokyo has hosted the Olympic Games. The Summer Games in 1964 provided an enormous boost for the Japanese economy, infrastructure and technological progress. Haneda International Airport was modernised to receive international visitors. The first high-speed bullet train began running nine days before the opening ceremony, an important symbol for Japan's image as a technology leader. Something similar is expected from Tokyo 2020: a *tour de force* of innovative capacity.⁹

Abenomics

The government of Shinzo Abe accords high-priority to economic recovery, growth and prosperity. Its economic policy (referred to as Abenomics) incorporates a growth strategy that encourages the private sector to invest through tax incentives (Japanese businesses invest much more abroad than in Japan) and a less restrictive monetary policy. In addition, a number of structural reforms have been announced, also in education. Revitalisation of the countryside is another key priority: "The decline of rural villages threatens the existence of Japan as a country", said Abe when presenting his budget to the Japanese parliament (the Diet).¹⁰ A Comprehensive Strategy on Science, Technology and the Innovation (STI) has been developed, with the aim of making Japan the most innovative nation in the world by 2030, contributing to solving global problems and creating a safe society with well-being at its heart.

Science and innovation policy

The Japanese Council for Science and Technology Policy was given a key role in implementing the STI strategy. In 2014 it was renamed the Council for Science, Technology and Innovation (CSTI). "That is a mark of the importance that the government attaches to this topic", says Dr Yuko Harayama, vice-president of the CSTI. "We are sitting here right opposite the office of the Prime Minister; we report directly to his Cabinet, and we are in regular contact. We literally look through the window over his shoulder." The CSTI advises the government on policy, but also implements part of that policy.

⁹ Discussion with Yuko Harayama, CSTI.

¹⁰ The Japan News, 30 September 2014, front page.

Japan concentrates its STI policy around five themes:

- ▶ A clean and viable energy system. The Fukushima meltdown showed the vulnerability of the Japanese energy supply. Much energy is now imported in the form of LNG, but the ambition is to be largely self-sufficient. Renewable energy is the top priority here, but safe nuclear energy is not ruled out.
- ▶ Healthy and active ageing. There is a strong emphasis on technology that supports older people in their daily lives (Daily Life Helpers). Technology is being developed which will enable faster selection of active ingredients for medicines and produce customised medicines and doses. Supporting muscle strength is just as important, Japanese pioneers are developing robotics for this.
- ▶ Next Generation Infrastructures. This theme is about smart cities, next-generation city planning, and a resilient society. New energy infrastructure is needed; a great deal is expected of 'smart grid' technology.
- ▶ Reindustrialisation by exploiting regional resources. Agriculture, forestry and fisheries need to be given a new impulse through technological development. This must also form the basis for new, more ambitious reindustrialisation of rural regions.
- ▶ Preparation for natural disasters and, to limit damage, a rapid recovery from the Great East Japan earthquake. The energy supply and the next-generation infrastructure must be resistant to earthquakes and other natural disasters. There is a need for early-warning systems and better protection from radioactive material.

The choice of these themes was prepared by the CSTI after consultation with stakeholders. They are continuously promoted by the government. In addition, there is attention for supporting technologies, such as ICT, nanotechnology and environmental technologies (recycling, resource-efficiency, monitoring systems). The CSTI plays an active role in implementing policies on these issues.

Coordination

The CSTI coordinates the establishment of the total STI budget. Japan invests heavily in research and innovation: around 3.4% of GNP (compared with 2.15% in the Netherlands in 2014). These investments are increasingly financed by the government, though the private sector plays a major role in Japan (accounting for around 80% of total R&D spend). Based on the five themes, government ministries draw up their research plans and ambitions. Following a recent change, these plans are then assessed by the CSTI. If there are overlaps or gaps in the proposals, the CSTI can issue instructions. The result is a more balanced distribution of resources across the themes. This cross-ministerial cooperation applies for both to fundamental and applied research.

The CSTI has appointed ten programme directors for specific topics that have been developed on the basis of the five themes. For the energy theme, for example, there is the Innovative Combustion Technology research programme, which is intended to help bring about greatly improved engine efficiency, to reduce CO2 emissions, and save energy. Until recently, research funding from the government was mainly used for pre-competitive programmes. That has now been abandoned. Nissan is fully engaged in the research programme, and this is leading to some debate about whether this is the right use of public money. “It isn’t always easy to explain to taxpayers why the government supports companies such as Nissan so generously”, says Harayama. Other topics based on the energy theme are advanced heat-resistant structural materials and the ‘Energy Carrier’ programme which aims to contribute to the development of a low-carbon society using hydrogen-based renewable energy. The Next-Generation Infrastructures theme underlies a major programme on Automated Driving Systems. The programme director works for Toyota. Another programme is Smart Farming, aimed among other things at making agriculture less labour-intensive and developing new functional foods.

ImPACT programme

The CSTI also has its own budget to promote innovation. The background to this is a recognition that research funding mainly goes to existing companies, renowned research institutes and older researchers. To the establishment, in other words, rather than to genuinely innovative research. In a bid to create opportunities for innovative research and disruptive technologies, the ImPACT programme was created (Impulsing PARadigm Change through disruptive Technologies). Through this programme, the Japanese government invests in

high-risk, high-impact R&D. The CSTI appoints programme directors who are tasked with seeking out new ideas that are innovative, disruptive and transformative. It is by no means a requirement that they be academics or professional researchers; they may also be private companies. Five topics have been named under the ImpACT programme, which can again be largely traced back to the five STI themes, but proposals falling outside these topic areas are also eligible. Twelve programme directors have so far been appointed, often relatively young and often attached to private companies. The total budget is small (around 50 million euros per year), but the expectations are high. At the heart of the programme, however, is the idea that not every project needs to succeed. On the contrary, a great deal can be learned from projects that ultimately do not deliver results.

This, then, gives the CSTI its own role in the policy. What does all this mean in practice, for research institutes, companies and government ministries?

Tokyo University: number 23 in the world rankings, number one in Asia

We spoke to the vice-president of Tokyo University, Yoichiro Matsumoto. He is disappointed. For years, Japan' investments in research and science were stable, admittedly lower in relative terms than in the United States and China, but stable nonetheless. Then five years ago, austerity measures were introduced, which saw the budgets of fundamental research in particular being cut. The response was a cooperation agreement between Japan's eleven research universities (RU11). All things considered, they are still doing well: in 2009, the share of RU11 publications in the 10% most frequently cited publications was 13%; in 2013 it exceeded 20%.¹¹ Japanese research excels especially in the fields of physics, astronomy and chemistry. And where in the 1990s only one Nobel Prize was awarded to a Japanese researcher; in recent years there have been several Japanese Nobel laureates, two of them in the field of life sciences (stem cells).¹²

But there are concerns for the future. First, there are doubts about the quality of pre-university education. "The entrance exams for universities are very demanding", says Matsumoto. "As a result, secondary education is focused on passing those exams, not on teaching students how to think and reflect; not on

¹¹ See: The Netherlands, Japan, RU11 and Research Performance (paper), Elsevier, 2014.

¹² Hirata and Warschauer, pp. 237-238.

wider issues or a wider context. Once prospective students have passed the exam, once they have passed through the University of Tokyo's famous red gate, they are so tired that they are unable to do anything for a while. And they don't need to, because admission means that students are more or less guaranteed to obtain their degree. Students have little or no interest in the rigours of academic training.”

Secondary education is focused on examinations, but also on character-building. Shared lunches with teaching about Japanese food, its production, its nutritional value. Daily classroom cleaning shifts; uniforms; lots of sports days. Little attention is paid to individual development. This culture continues in universities and in research.¹³ “Japanese students welcome their university years, which have been called ‘a time-out between entrance exams and employment’ (...). Universities are forced to compete for students in order to remain in business. This creates a fast-food type of educational experience, with large lecture courses, little attention to quality and low standards”, write Hirata and Warschauer,¹⁴ adding: “Scientific research benefits most from argument and challenge – and it is precisely that that is lacking.”

Japanese universities are privately funded; there is little public money available. Rankings matter: when Japanese universities slipped a little in the world rankings, it was front-page news. The concerns about funding are widely shared. Following the Mount Ontake volcano disaster, in which more than fifty people lost their lives, critics once again pointed to the lack of research funding. The dearth of research funding mainly affects areas which are unlikely to produce rapid results, especially if the research is long-term in nature.¹⁵ Volcanology requires measurements over a long period; studying an inactive volcano for five or even ten years does not usually produce spectacular results, and this puts the funding in jeopardy. In total, Japan has fewer than forty volcano experts, according to The Japan News.

On the other hand, there is not always enough work for people with academic training. As vice-president of the University of Tokyo, Matsumoto tries to encourage businesses to take on Ph.D. candidates, but with little success. “Companies are not looking for ‘deep knowledge’ or an academic attitude; they want people who can apply knowledge and develop technology.” Japanese companies consequently invest heavily in extensive on-the-job training programmes.

¹³ Hirata & Warschauer, p. 237.

¹⁴ Hirata & Warschauer, p. 233.

¹⁵ The Japan News, 7 October, 2014.

The Abe government recognises that the quality of education needs to be stepped up, with more cooperation with foreign universities and more focus on English, of which Japanese students and researchers have only a limited command. The government has designated 37 universities as 'global universities'. There is also an ambition to have ten Japanese universities in the world top 100, an exclusive club in which Japan is currently represented only by the universities of Tokyo and Kyoto.¹⁶

Japanese students and researchers do not always actually value going abroad. A Japanese university which took the initiative of requiring all researchers to spend at least one month a year abroad was overruled it was not deemed acceptable that Japanese taxpayers should finance research in other countries.

There is not much movement in the other direction either. "The government would like to attract more foreign researchers, but doesn't have enough money to fund this", says Matsumoto. Collaboration with the United States is difficult because the US does not spend research money abroad. Horizon 2020 offers opportunities for collaboration with third countries, but Japan has to finance its own participation. EU representatives negotiate on the conditions and procedures for participation in Horizon 2020; those negotiations are slow-moving, but there is at least the prospect of a number of joint projects materialising.

Industry

Japanese industry enjoyed its zenith in the 1980s, producing cars, steel and electronics. The economic crisis of the 1990s has cast a long shadow, and in 2014 Japanese industry invests more abroad than in the domestic market (approximately 100 billion dollars a year), while foreign inward investment in Japan has fallen to virtually zero since 2009. Despite this, manufacturing industry is still important for Japan. Although it employs fewer people (17% of the workforce), there is "an almost mystical belief in the art of making things".¹⁷

"Japan is innovative", says Dr. Jos van Ruyven, president of DSM Japan. "Splendid materials – and combinations of materials – are developed here, with a wide range of functions: mechanical, magnetic, dielectric, optical, and so on.

¹⁶ The Japan News, 28 September 2014.

¹⁷ Pilling, p 170.

But the country currently lags behind in terms of applications. The Japanese are also good at miniaturisation, for example jacks for the iPhone. They have great know-how in small components, and miniaturisation is still one of their strengths. DSM is involved in the material part of things.” DSM has lots of ‘established’ relationships, such as with Mitsubishi Chemicals. DSM employs 180 people in Japan, three of whom are Dutch.

“The game is about to change” says Van Ruyven. “Japan faces a number of dilemmas, and its population is shrinking. There are some very good achievements in materials development, but a lack of applications. Japan is no longer a pilot market; Japan as a platform no longer works. Take consumer electronics, for example: these are no longer either developed or made in Japan. Alongside the automotive industry, this was the industry that brought new materials to the market, first in Japan and, if they proved successful, rolled out to the rest of the world. It no longer works like that in electronics.” There are plenty of other examples. Perfect fibres have been developed, but no applications have yet been found for them. There are dreams about cables for linking satellites to the Earth (space tethers), to facilitate transportation, but for the moment these are distant pipedreams. “Developers are often only in contact with direct customers”, says Van Ruyven. “By contrast, Dutch companies tend to look at the end user and tailor their development accordingly, based on the application that the end user wants. That’s quicker, better and more effective than the Japanese way, though it does carry the risk of tunnel vision. “

Japan is known as a country that is better at perfecting existing technologies and products than developing totally new concepts. Sony, one of the country’s most innovative companies, is an example of this. The Walkman was invented by Sony, but the MP3 format could not be played on it. For the time being, there are still good markets for Japanese niche components. But according to Van Ruyven, the question is how long Japanese companies will continue carrying out the specification work in Japan. A great deal of R&D already takes place in the United States, for example. Japan is also expensive, with high wage costs and high corporation taxes (up to 40%). Confidence in the government’s innovation policy is not yet great enough. But Van Ruyven does believe there are still enough opportunities.

Take population ageing. Thanks to its discovery of induced pluripotent stem cells (iPS), Japan has become a leader in the field of stem cell research and applications. Materials play an important role in this emerging branch of regenerative medicine. There are also many older people living alone in Japan with the typical problems of ageing. Japan is working to develop a completely

new infrastructure aimed at keeping these people healthy for as long as possible, or at least outside the expensive medical institutions. Sensors can provide solutions if something goes wrong with a person's health. Links could also be established with the neighbourhood shop (Family Market or 7Eleven), for example to order a different ready-made meal. Another idea, which could be of interest to a company such as DSM, revolves around individually tailored food supplements. Achieving all this requires data, and Big Data is accordingly the current buzzword in Japan. Less stringent privacy laws, fewer impediments to accessing and using data, offer opportunities for developing and providing new services.

Another area where Japan has taken a clear lead is in the development of a hydrogen economy. A great deal is currently being invested in hydrogen, and the Netherlands could tap into this. Toyota will be launching the first commercially available car to be powered by a fuel cell next year. And even though it is a pioneer in the field of hybrid vehicles, Toyota has less faith in electric vehicles for the long term because of their disadvantages which are not easy to overcome. A great deal of attention is being given to developing the necessary infrastructure for hydrogen. Mitsubishi and comparable players are investing in hydrogen generation; others are experimenting with introducing hydrogen to existing fuel stations and the existing infrastructure. Combining this technology with renewable energy offers great promise. Surpluses of solar, wind or tidal energy could be used to produce hydrogen, at a stroke offering solutions for energy storage and greener transport.¹⁸

Technology: no fear of robots

Japanese universities have solid links with industry, according to Van Ruyven. Contrary to what is often assumed, Japanese students lag behind rather than taking the lead in technology.¹⁹ But technology is greatly valued, and solutions to problems are usually technological. Robots are a good example. Dr. Sankai, one of the programme managers on the ImPACT programme, foresees innumerable applications in the medical field alone. Robotics are helping paralysed people walk again; spectacular results have been achieved with robotic legs which are controlled by the wearer's brain and overcome paralysis. Robotics can also supplement the muscle power of healthy people, with robot-like attachments on the hips and back enabling them to perform heavy lifting.

¹⁸ The Japan News.

¹⁹ Hirata & Warschauer, p. 230 ff.

Driverless cars are another example. The University of Kanazawa, Toyota, Honda and Nissan are working together on programmes to improve autonomous vehicle technology. These vehicles can substantially reduce the number of accidents. There is also a need to develop this technology “because of the rising number of older drivers”. The government hopes it will be possible to demonstrate these driverless cars during the Tokyo Olympics in 2020.²⁰

According to Van Ruyven, Japanese industry is remarkably resilient. “Fuji is a good example. The company used to specialise in photographic film, which until recently accounted for more than 80% of sales. Fuji applied its knowledge of film technology (thin layers, colloid chemistry) to cosmetics and dosing systems for medicines, and is now a successful manufacturer of pharmaceutical and cosmetic products. On the other hand, it is also the case that all eyes in Japan focus on the same thing, which means change often does not happen. The Japanese SME sector needs to develop a more international focus.”

Relations with the Netherlands

The Netherlands Embassy plays an important role – the government is important in Japan, and representatives of the Dutch government and other authorities can be helpful in that context. The Residence is located in one of the few old buildings in Tokyo, entirely done out in Dutch design. At the entrance hangs a sort of seventeenth-century ‘entry ticket’ for Dutch ships. The embassy in Japan is heavily focused on economic relations, and to a much lesser extent on cultural activities. The Netherlands is the third biggest investment market in the EU for Japanese business, after the United Kingdom and Germany. There are 450 Japanese companies established in the Netherlands, employing around 40,000 people. There are also around 25 joint projects. Embassy staff have lots of experience. Collaborating with the Japanese is often a slow and arduous process; compared with American companies or institutions, it takes a long time to formulate a joint objective. But once the trust has been built up, signatures follow quickly. The Embassy devotes itself to attracting Japanese investments to the Netherlands. The Netherlands has a benign tax climate and a highly skilled workforce.

Japan is definitely interested in Dutch agriculture. The Japanese are fascinated that a country as small as the Netherlands can be the second largest exporter of

²⁰ The Japan News, 7 October 2014.

agricultural products in the world. Japan recognises the qualities of Dutch agriculture, and agriculture and regional development are among the top priorities of the Japanese government.

Japan gets really excited about new technology. That contrasts with the Netherlands, where there is serious debate about – and a fear of – robots, and also with the EU, which currently has no clear policy on issues such as GMO technology. In Japan, by contrast, disruptive technologies are actively promoted. But in Japan, too, a balance needs to be found. Technology does not just spawn winners.

Europe – sharing but no cooperation

We spend part of the day at the EU representation in Japan. Invited guests include agricultural, environmental and science and innovation attachés from the EU Member States. The atmosphere is the same as at the EU representation in China: Member States are willing to help each other here and there, to share information, but are really interested in developing their own contacts with Japanese businesses. The topic under discussion is the biobased economy. I explain the European policy, and there is a summary of the Japanese approach. The correspondences are striking. Japan – just like the Netherlands – is keen to invest in bio-energy and is wrestling with the question of where the necessary biomass will come from, how sustainable it is and how biomass can best be used. There are high expectations of a regional approach. Japan needs bio-energy to reduce its dependence on imports of LNG; 96% of biomass is imported, mainly from the United States and Canada.

Major research projects are being undertaken. Japan is participating in the Wageningen University & Search (WUR) research on the production of algae. But biobased production is an on-off affair in Japan. At present, interest is on the up again, for example in residual flows (waste and inedible plant parts). There is a great deal of knowledge in Japan about seaweed, both as regards its nutritional value and production methods. That knowledge is definitely of use for the Netherlands.

To promote the circular economy, the Japanese government has created the Biomass Towns programme. It is a good example of the ‘Japanese way; a clear goal has been set (300 biomass towns), industry will be involved and then it will be all hands on deck to pull everything in the right direction. No imposed regulation. How does this work in practice ?

Agriculture

We pay a visit to the Ministry of Agriculture, Forestry and Fisheries. Japan attaches great importance to agriculture. Japanese farming is typified by its small scale, with the average farm being just 1.9 hectares. Agriculture is one of the main stumbling blocks in the negotiations on the Transatlantic Trade and Investment Partnership (TTIP). Rice is subject to an import tariff of 778%. The Japanese like their own rice; they do not value Thai rice, which they only eat when there are domestic shortages. Other products also carry high import tariffs. Dutch efforts in the field of agriculture and horticulture are focused mainly on gaining market access; around 1% of Dutch agricultural exports currently go to Japan, mainly bell peppers, pork and flowers. Once again the theme here is change. The Japanese farming industry needs to adapt – to a new trade treaty, to the new demographics. Japanese farming employs mainly part-time and older workers. But the Japanese government sees opportunities here, especially for revitalising and reindustrialising the countryside.

Biomass Towns

“The Japanese government launched its new policy way back in 2002”, says Eiji Tanimura from the Ministry of Agriculture, Forestry and Fisheries. “The aim was to create a sustainable society by making maximum use of biomass, reducing greenhouse gas emissions and revitalising the countryside. The target was to establish 300 Biomass Towns by 2010. Today there are 423 Biomass Towns, and the new target is 600 by 2020. That’s around a third of all Japanese municipalities.” The Great East Japan Earthquake and the nuclear disaster at Fukushima have underlined the urgency of this effort. The need to strengthen the regional energy supply led to a stepping up of the programme.

What is a Biomass Town? Town councils draw up a plan describing how biomass will be collected and used within their municipality. This biomass consists of prunings and thinnings from the forests, as well as agricultural (manure, inedible plant parts) and food industry waste. Schools, households and businesses have to be involved. The aim is to produce biogas, bio-electricity, compost and heat for glasshouses, as well as biodiesel from used cooking fat. Subsidies are available to help fund the necessary infrastructure and the start-up costs. However, only the initial investments are covered: the aim is that biomass towns

should be viable without subsidies. That is not yet the case: around 70% are faced with operational deficits.

To make the projects more viable, the intention now is to increase the scale by creating Biomass Industrialised Areas. The aim is to create a hundred areas between 2013 and 2018; sixteen have been approved so far. They operate in the same way as Biomass Towns: there must be an integrated plan for collecting the collection and utilisation of biomass. The biomass regions are largely self-sufficient in energy, resistant to natural disasters and are adding new industrialisation and new jobs to the economy. Start-up subsidies are available for biogas installations and for the fermentation and recycling technology. There is also a strategy to create a market for products from Biomass Industrialised Areas. "But the aim is that the biomass regions should be viable without subsidies", says Tanimura.

Emperor Akihito

We visit a food waste recycling plant on the outskirts of Tokyo. The plant has now been running for two years. On the wall hangs a large photograph commemorating the recent visit by Emperor Akihito, a very great honour for the plant and a sign of how much it is valued. The owner explains that, until recently, food waste was not well utilised. Incinerating food waste requires quite a lot of fossil fuel. His plant produces biogas from food waste, thereby achieving a great saving in fossil fuels and a reduction in CO2 emissions. Once the technology has been developed further, this will be possible entirely without subsidies. At present, the food waste comes mainly from restaurants and food manufacturers, which pay slightly more than the usual waste collection cost for collection. The plant owner is in regular contact with the Olympic Committee, which is keen to establish Tokyo as an environmentally friendly city, a city in which environmental technology sets an example for the world. "The big challenge now is to collect food waste from households", he says, "but we have good plans in place for this. At the same time, we are conducting a campaign to reduce the amount of food waste produced by consumers".

Slow growth?

The Japanese way (setting targets, then setting about achieving them) works. The targets haven't yet been fully achieved, and things are by no means optimum yet, but a great deal is happening. Which direction Japan will ultimately

follow is not yet clear. The government is targeting more growth, more interaction with other countries, more innovation, better education. Whether this will prove successful is not certain. There are a number of tensions in the policy. Shinzo Abe argues that an international orientation is very important for Japan. At the same time, he constantly stresses the value of the traditional way of life and of the Japanese culture in which nature plays such an important role. Those twin aims can go together well, but they can also conflict. One conflict is in any event apparent in the negotiations on the Transatlantic Trade and Investment Partnership (TTIP); Japanese industry supports the negotiations, but opposition in the farming community, where traditional Japanese agriculture is protected by the import tariffs, is fierce.

There is also opposition from other quarters. Does Japan really need to grow, especially given its shrinking population? Is slow growth not better for Japan? Would it not be better to focus on the problems facing society and on the well-being of the population? David Pilling, a former correspondent for the *Financial Times*, quotes Machiko Satonaka, a Japanese opinion-leader: "People talk of Japan as losing its economic power. But that's OK. We don't care. We don't want to be a superpower. Our values are evolving. Now our dreams should be to create a safe society and a clean environment". According to Pilling, this reflects a powerful undercurrent in Japanese society. There is more to life than the Gross National Product. The Japanese are pioneers of a new kind of "high-quality, low-energy, low-growth existence", recounts Pilling.²¹ He also believes that the 'plant metaphor' works well in Japan. A plant can only bear fruit if it is mature and no longer growing; Japanese society is now at a place where it can bear fruit and give priority to quality of life.

Number x

The Abe government is targeting a position high in the world rankings for economic growth and innovation. But not everyone shares this ambition. "Japan doesn't need to be No.2 in the world, nor No.5 or 15. It's time to look to more important things", says Pilling.²² The outcome is unclear, but what is clear is the focus on developing those technologies that contribute to the well-being of the population. What is also clear is the focus on intensifying cooperation with other countries. There is a policy of warming up the cooled relations with China; steps have also been taken to strengthen international cooperation in the field of

²¹ Pilling, p. 175.

²² Pilling, p. 174.

science and technology development. It is unclear how Japan will develop, but it is certain that the path or development it chooses will have an influence on the rest of the world. For that reason alone, it is important to monitor developments in Japan.

What can the Netherlands learn from Japan?

Japan is making clear choices in its science and innovation policy. Five themes have been established, with a strategy that sets the priorities. Coordination between government ministries increases the commitment of specialist departments and ensures the more effective use of resources. Another interesting element in the science and innovation policy is the ImPACT programme, a strategy of funding high-risk, high-impact projects. This takes policy outside the existing frameworks and gives young people with innovative ideas an opportunity to develop them, to succeed but also to fail. The Japanese way (setting goals, freeing up resources, involving industry, a bit of fine-tuning and then making a start) can also be an inspiration for the Netherlands. A clear market is being created for innovative projects, services and products. And technology almost always plays a role in this.

More generally, the Netherlands could learn from Japan how to deal with shrinkage, with slow growth and with recession.

What can the Netherlands offer Japan?

The Netherlands is held in high regard for its agricultural and horticultural sector, seed distribution, etc. There is also interest in Dutch environmental technology (recycling). Given the Japanese desire to reform its education system, teaching methods and the way research is carried out are also of interest for Japan, as is the focus on independent thinking in Dutch education. As an open society, the Netherlands has lots of experience with internationalisation, including in the fields of science and innovation.

On the innovation front, the broad approach taken by Dutch businesses of looking for better cooperation in the chain in order to generate resource-efficiency and new services or products, also offers points for engagement.

What opportunities are there for the Netherlands?

Dutch life sciences research is of high quality, as is that in Japan. The same applies for the high-tech sector. Cooperation in these areas could be complementary and generate mutual benefits. Japanese companies invest a great deal abroad, and the Netherlands could raise its profile in precisely these areas. There are also opportunities in the area of agricultural technology

Perhaps the greatest opportunity lies in dialogue with Japan on social issues that are important for both the Netherlands and Japan: a clean, stable energy supply, population shrinkage and ageing. Discussions could generate new insights, new problem definitions and new approaches. Cooperation between scientists and between businesses could contribute to this.

Conclusion

The five days I spent in Tokyo definitely gave me an impression of Japan, its society, its economy and its politics. The Japanese are open about the problems in their society, but do not always find it easy to put their finger on precisely what the problem is. Is population ageing a problem because it will lead to shortages on the labour market, because of growing health problems and loneliness, or because of the difficulty in affording pensions? Can those problems be addressed without doing something about the underlying cause, namely dejuvenation? What is striking is that the solutions are generally sought in technology.

I took the train to Kyoto, the superfast Shinkansen train. On the way to the station, I finally saw my first tramp in Tokyo. Nothing, it seems, is what it seems.

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