

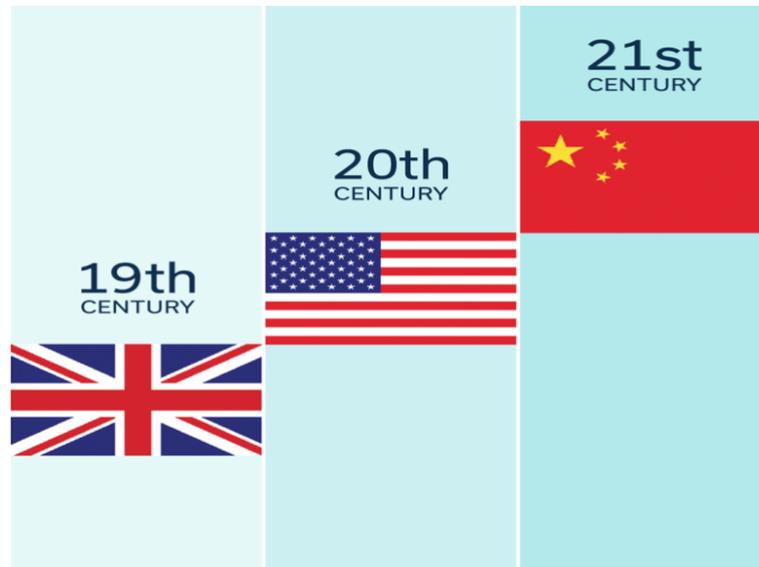
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We live in a changing world. Whereas Great Britain ruled the world in the 19th century, the 20th century belonged to the US. And the 21st century will be China's century. For us in the West, it was relatively easy that the US was taking over from Great Britain. After all, we had more or less the same culture. This is not the case this time: China's culture and ours in the West are very different. For us, China is hard to understand. And the size, the scale of China is overwhelming. We need some time to come to terms with this: that the world power will change hands or at least needs to be shared with China. Some of us have even closed our eyes for this development.

And there is yet another race. At the same time we are moving into the 4th Industrial Revolution. A time of fusion of technologies: Internet of Things, Industrial Internet of Things, smart factories, smart logistics, smart cities. Data is the new oil as some people say. Artificial Intelligence is the brain of the new development.

And we all, US, Europe and China - and may be others too - want to be the frontrunner of the new innovative developments. We all want to be at the forefront of the new technology frontiers. Can we all be winners - Europe, China and the US? Even in the current world full of tensions - as we can read every day in the media? In this world were some countries seem to withdraw in protectionism and are advocating local supply chains? In my view the answer is YES. It is our choice to make it a YES. I personally do believe that if we are willing to move forward together we can all be winners.

To be against globalisation is to be against the essence of the current technology developments, which integrate everything with everything and everything with everyone everywhere. Advancement needs collaboration. Only if you put your own state of the art technology in a basket and invite a few others to do the same, it is possible to jointly develop new applications and standards that make  $1 + 1$  more than 2. This way we can make  $1 + 1 = 3$  or even more.

Trump and his 'America First' policy is one answer to the shift in global power, to the notion of China dominating the 21st century and to protect the innovation capacity of the US. By engaging China into a bilateral trade war, the US moves away from the current global order - seeking more sovereignty for the US. It is not my preferred style, but that said:  
allow me as a European to give my own European perspective.

In Europe there is a country, who also seeks more sovereignty, especially economic sovereignty and that is Germany. The same Germany, which introduced the famous Industry 4.0 concept a few years before China announced its national innovation plans, Early this year Germany introduced a sequel to Industry 4.0

After Midea took over Kuka, some of us in Europe including the German politicians were somewhat concerned. One company was giving away a critical technology of robotics to another company. The technology moved from one country to another. And now the Midea robots are producing BMW cars in China. Gone was the technology and the role of Germany. When the German government experienced a similar situation, they acted differently. Last year, the CEO of the German company 50 Herz welcomed a Chinese investment of 20% of their shares. The co-operation with the Chinese company would assist 50Herz in developing a new energy grid faster than it would otherwise achieve. The German government however said 'stop - we do not want this to happen, as the energy infrastructure is critical infrastructure'. They stepped in and purchased the 20% shares which left the Chinese company with nothing. The CEO of 50Herz publicly supported the move of the German government.

This was an extra ordinary act of the German government: a state intervention in a free market country of Europe. This no one envisaged. The German government using its visible hand in the market to correct the invisible hand of the market.



Berlin had a change of mind. The most remarkable change in Germany's innovation strategy lies in the role of the state: Germany is moving towards state-led innovation. This change is carefully worded in the official 2030 National Industrial Strategy document. It echoes China's policy documents. Germany's document starts out with a bit of history on the role of the state in Germany by saying: 'our state has directly assumed responsibility for the creation and maintenance of prosperity since the times of Ludwig Erhard. As a German cabinet minister, Ludwig Erhard, was responsible for the rapid rise of Germany after the second World War. In less than 20 years Germany experienced a Wirtschaftswunder - an economic miracle -. German rapidly became the 2nd largest export country in the world. German's economic rise was envied by much of the world. Do you see the comparison with China story - on a different scale however ?

In the 2030 strategy report, the German government continues to argue that sometimes business decisions may not always be in the interest of a country and it is in these instances that it is justified that governments intervene. 'If the market forces within a country's economy cannot maintain its innovative strength and competitiveness then it is the responsibility and the task of the state to step in'. Germany seeks what it calls economic sovereignty for the state.

Germany's National Industrial Strategy 2030 lists key industries it wants to protect and to move forward into the 21st century tech frontier: steel, copper and aluminium industry, chemicals industry, mechanical engineering and plant construction, automotive, optical industry, medical devices, GreenTech, armaments industry, aerospace and 3D printing. Furthermore, the report mentions that the long-term success and survival of existing German champions like Siemens, Thyssen-Krupp, Deutsche Bank and its car manufacturers are in the national interest of Germany - open ground for the government to intervene when considered necessary in the national interest of Germany.

The document - and therefore the German government - also favours the notion that supply chains better be localised into one economic area above global supply chains. 'If the US provides the AI and China provides the batteries to the German car industry we have a too limited role to play' is the reasoning.

Soon after Germany published its 2030 strategy of economic sovereignty, the EU competition commissioner blocked a planned merger between German and French train manufacturers Siemens and Alstom who wanted to merge in order to better compete with China's CRRC, the world's biggest train maker. The German government was not amused nor were the French.

A few months later, France and Germany jointly published a manifesto for a European industrial policy fit for the 21st century. The manifesto is very much a summary of Germany's 2030 strategy. The manifesto seeks a much stronger role for the state in the EU for each member country:

- greater state-control in foreign investments
- wider scope for state-aid, state funding of innovative industries
- temporary or short-term involvement of the state in specific sectors to ensure their stay on track to remain competitive.

Given this context the different models of technology transfers will be restricted

- Sales intensive technology transfers may be restricted as governments may not approve the sale
- Research intensive technology transfers may be restricted in the geographical scope of the participants to keep the technology close to home
- Manufacturing intensive and development intensive technology transfer may be restricted in the selection of partners as governments like Germany are seeking to move supplies chains locally, in this case within the EU.

In such a world whereby Germany and maybe other European countries will claim more economic sovereignty and want to actively engage in the market economy to ensure its innovative competitiveness, we need a few 21st century new models for technology transfer.

Allow me to share my personal ideas about this.

I see four technology transfer models with a high potential.

1. Technology Providers
2. Interworking on a Tech Platform
3. Tech Transfer Hubs
4. Tech Transfer for national interest

### 1. Technology Providers.

This is technology transfer whereby one or two companies, who are willing, who explicitly want to, sell their technology to another company. This is especially good for technologies with a long-life-cycle, not for fast innovative technologies.

A good example is Siemens, Kawasaki and Alstom, who at the time provided to China the technology for the high-speed trains or the familiar bullet trains as we call them now. The three companies earned a lot of money as a return on their earlier research in the first few years when they had a 2/3 market share. Subsequently they entered in a 49% Chinese joint venture and the rest is history. China now exports its own bullet trains all over the world. This was a good arrangement: the three companies earned their investment back and gained profit on top of it and China has commercialised the technology very well.

### 2. Interworking on a Tech Platform

The second model is based on the current principles of how global standards are developed in certain industries. For example, around 5G. Companies from all over the world review and debate which new technologies will be best to be used for global standards. Each company can bring in its patents and when they are selected as the best technology and become part of the global standard those companies will gain the revenues of the patents in the future. This makes that the new technology standards are world class and will be shared amongst all companies of many different countries in the world. You put technology in and you get revenues back as well as the use of other technologies.

This has a major advantage above the Midea - Kuka case as we discussed earlier. In this model technology transfer is not from one company to another. It prevents the situation whereby one company - often from a foreign country - gets new technology capabilities and the other company - in the home country - loses the technology. In the new 21st century model, different companies from different countries chip in technology and all of these companies from all of these countries get access to the new technology. This way the national interest is served and the national innovative competitiveness is secured.

### 3. Tech (accelerated) transfer hubs along the Belt and Road

In the current world full of tensions, it may be wise to seek some neutral ground for technology transfer. The Belt and Road mechanism ensures government engagement, so national interests are served. Imagine that one or more European countries bring in research - that is where we Europeans are good at - and China brings in application engineers - that is where you China is good at - then we create together the possibility to accelerate the transition of research in to practice, to new technologies and/or technology applications. This would benefit us both, for sure.

Alternatively, some countries can set up a simple tech transfer hub along the Belt and Road where entrepreneurs and/or multinationals come together on a voluntary basis in an open eco-system to interwork together using their own technologies to create new ones.

These technology transfer hubs can have a particular theme like food technology, robotics etc. It may also be interesting to set up some interdisciplinary hubs.

#### 4. Tech transfer for national interests

There is also a very simple model, which immediately serves the interest of a country and increases its national innovation capabilities. In my home country the Netherlands we have invited Huawei, the German T-Mobile and French Vodafone to work together with top players in the Netherlands to develop new 5G Industrial Internet of Things for water quality treatment, agriculture efficiency and a few other projects. What is more simple than that?

All these four 21st century technology transfer models combine three principles:

- Collaboration amongst the willing
- (International) relations building
- in line with national interests

I hope I have shown you that in the current context of countries seeking more economic sovereignty and protection of their innovative competitiveness, it is more than feasible to still transfer technology, to have global supply chains and advance together in the 21st century with China as a new global player on the stage whilst moving into the 4th industrial revolution.