

## Patents and Innovation, What We Learn From History<sup>1</sup>

I am grateful to be able to witness today the grant of the DSM Special Invention Reward. This prestigious award is given to select DSM researchers whose exceptional scientific achievements have been patented and have created a distinct line of business for DSM. DSM's most prestigious inventions and its creators are being celebrated today. It seems to me that an appropriate topic for today's festivities is to take you back for a moment in history to show the relationship between patents and innovation. Let us see what we can learn for tomorrow what happened yesterday.

This is the time of the year that we can read about inventions that top the list of imaginary innovations, the best of the best – like TIME's "Best Inventions 2006", where YouTube appears as top invention of 2006, as well as hypoallergenic cats, a hydrogen bomber and a new way of drying your wet umbrella.

When people think of innovations they fantasize about tourism to Mars, immortality in a bottle, or a smarter internet. In fact the best innovations of all times are those that take into account to what degree inventions are actually used by people. As David Edgerton points out in his newly published book: "*The Shock of the Old*", corrugated iron **[SHOW slide of ROOF]** is as revolutionary an invention as is the microchip, as this light durable and easily worked building material is used for walls, roofs and even to collect rainwater, patented in 1829 to shelter goods waiting in London's harbor. It became a global technology, changing our lives more dramatically than the hot new ones.

So let us explore history to see what innovations and patents have to do with each other and what lessons can be learned from it.

After the American Revolutionary War with Britain, many of the English traditions remained in the hearts and minds of the Americans. One of those fundamental notions was that patent

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<sup>1</sup> *This is the text of a speech given by Severin de Wit on the occasion of DSM SPECIAL INVENTION REWARD 2006 on January 9, 2007 at "Huis van de Toekomst" in Rosmalen, Netherlands.*

Material for this lecture has been inspired by and some parts have been taken from: Pat Choate *Hot Property*, "*The stealing of Ideas in an Age of Globalization*", New York Alfred A. Knopf (2005), Newsweek, "*Invention, Slow and Steady*", January 8, 2007, David Edgerton,

protection encouraged innovation. By the late 1700s, Britain had the longest continuous patent protection in the world, tracking back to 1449 when Henry VI issued John of Utynam a letter patent granting this Flemish glassmaker a twenty year monopoly on the process that produced the colored glass windows at Eaton College. **[SHOW colored glass slide]**

After American's Independence, creating a working system of patents was a top priority for the first American President, George Washington. In his first State of the Union on January 8, 1790, he recommended Congress to enact legislation to encourage the introduction of new inventions from abroad and foster their creation domestically. Congress acted quickly and enacted the first Patent Act in April of that same year.

The Patent Act made issuance of a patent a matter of the highest importance. There was no Patent Office. Rather the issuing of patents was handled by the President, George Washington, and three senior cabinet officials, Secretary of State, Thomas Jefferson, Secretary of War Henry Knox and Attorney General Edmund Randolph. They met on the last Saturday of every month to review patent applications. If two of the three approved, a patent letter was prepared for the personal signature of George Washington.

Jefferson was surprised by the number of innovations inspired by the first patent act. More inventions were submitted than the three member Board could handle. The first patent act had a false start: too many inventors hated the system as long delays were faced before their inventions became patented. Furthermore it was very hard to get a patent: for every one patent granted, one was denied.

A new patent system had to be more flexible than the first 1790 Act. What emerged was the Patent Act of 1836, eventually the foundation of the modern patent system, with an appointed Commissioner of Patents as well as a major library of scientific works. The new Law marked a major divide in economic history. It unleashed a major innovative wave of breakthrough inventions among which:

- 1837: Thomas Davenport with an electric motor that could power shop machinery, thus creating power tools.
- 1844: Charles Goodyear was granted a patent on a process for "vulcanizing" rubber, creating a pliable material unaffected by temperature.

- 1854: Elisha Graves Otis demonstrated at the Crystal Palace Hotel in New York his new safety braking system for elevators, basically introducing the first safe elevator and by doing so transformed urban design worldwide

Major innovations at the time changed life dramatically and created whole new industries, not known by men before. However it came to a huge price, either because famous inventors had to fight to get their patent rewarded and enforced, or they were too greedy and convinced of the strength of their inventions that they failed to share at reasonable prices.

We all know Samuel Morse, a portrait painter and professor of literature of art at NY University. Here you see Morse's colored sketch of railway telegraph, ca. 1838. He conceived the first practical telegraph, helping to shape what became a completely new communications industry. Morse filed his patent application in 1838, got a patent two years later.

On May 11 1844 he wired from a chamber of the US Supreme Court to a small group in Baltimore the now famous message – chosen by the daughter of the US Commissioner of Patents – *“what hath God Wrought”*. Although he spent years in litigation over patents, he was eventually rewarded for his efforts and was prosperous in his later years.

However, as history also shows, a great innovation leading to a useful patent in itself does not always do the job. One of the best examples is the story of Eli Whitney and some of his best known innovations: the cotton gin

He came to his invention basically by accident. He was invited to become a tutor for a wealthy South Carolina plantation owner. On his arrival in Savannah, he was casually confronted with a major problem of that period.

The green cotton they were raising had short strands with seeds firmly attached to the fiber. The fiber was valuable but only without the seeds. All plantation owners and major cotton producers faced a major, insolvable problem. The cotton plant was easy to grow and easy to harvest but the fiber was difficult to separate from the seeds. Whitney – who had never seen cotton in his life – was captivated by the land owners request to try to come with something innovative. Whitney eventually came with what is known as a “gin”.

The gin was easy to make and caused the southern agricultural states to see its fortune changing overnight to become one of the richest areas in the whole country.

Whitney got his patent in 1794. What Whitney and his former host and now commercial benefactor, Miller, did not realize at the time was that smart licensing of a good invention brings a lot more gain than trying to own all the cotton gins, something that is very familiar in our age, but then again we have learned the advantages of an “open innovation”. Whitney and Miller’s charged high prices for anyone who wanted to use the invention. Because of the too high a price, competing cottoners copied Whitney’s product. Whitney found out the hard way that those who invent something valuable are destined to a life in court, particularly when the patent laws are weak and vague. Whitney had to fight in court to get his patent validated, which led him to say: “*An invention can be so valuable as to be worthless to the inventor*”. He found out the hard way that marketing and licensing the patent is as valuable to an invention as the invention itself.

Another lesson to be learned from history is that a successful innovation needs a fertile corporate environment and vision by business people who believe in the invention to make it a success.

Alexander Graham Bell was granted a patent that recognized him as the sole inventor of the telephone, US patent no. 174,465, eventually became known as “*the single most valuable patent ever issued in the history of the world*”. What is lesser known is that Bell brought his invention to Gardiner G. Hubbard, a prominent Boston attorney and entrepreneur. Hubbard helped Bell in finding practical business and political advice, understood wire communications and what it meant politically at that time. Hubbard got what Bell did not have to build the greatest telecommunications monopoly of its time: money, political connections, and above all business experience. Even after Bell was awarded his patent, few people immediately recognized its potential.

Hubbard also gave Bell the opportunity to show his telephone on a major exhibition, the 1876 Centennial Exposition in Philadelphia. Bell allowed Hubbard to make the appropriate arrangements for ownership of the patent and creation of a new company to develop it.

Hubbard organized a trust that issued 5,000 shares of stock. Bell shared the stock with Thomas Watson, his assistant, Hubbard, and Thomas Sanders, another key figure making his invention to become a business success, the Bell Telephone Company.

So what are the lessons learned from history?

- That innovation cannot foster without legal protection from sound patent laws.
- That great innovations need fertile and sound business environments.
- That groundbreaking inventions need clever enforcement strategies by people familiar with the intellectual property workings. Whitney learned the hard way that clever licensing can enhance the prospects of the invention, trying to be exclusionary and greedy can be disastrous.

So far we have seen what great innovations have done for welfare and our well-being. Whitney, Morse and Bell would not have reached their fame without the grant of a patent. However neither an invention alone, nor the sole working of a patent can achieve great business success. Neither can do without the other.

The importance of intellectual property is often underestimated. Like Whitney, Bell and Morse learned their lessons, the 21st century will prove that those that are best equipped by smart intellectual property strategies will be the next generation winners in a time of global challenges by low costs manufacturing countries, like China and India. Let me briefly explain.

My favorite question to students at the Rotterdam School of Management is: *Why do you think that President Bush when visiting China, always has intellectual property at the top of his agenda?*

The most instinctive response is that this is under pressure from the fashion, food and consumer electronics industry. Sure, Louis Vuitton deserves to be protected against piracy of its designs. But could Bush not leave this to Chirac? The real story is that policymakers have come to the conclusion that intellectual property and most notably patents, are the best protection against the low manufacturing threat from China and India. China's position as the "world's workshop" is based on a significant advantage with regard to manufacturing cost. Generally, one could say that the west has lost the manufacturing game. Chinese made products compete with European and American products on the respective markets.

Although much of China's current production of technology based products is still originating from the west outsourcing manufacturing, many Chinese operators are leaving the OEM model behind and start introducing their products under their own brands in western markets. Traditionally, the influx of cheap products has been countered by safeguards and anti-dumping duties, but these instruments and their application are restricted by WTO agreements. Although they temporarily can reduce the difference in price between local made and foreign products, they do not resolve the difference in the long run. Western economies are knowledge based. There is a long tradition of transforming R&D efforts into patents. This is different in China. Accordingly, in many tech sectors, Chinese companies who want to enter the western market need to license-in technology for their products. The royalties payable under such agreements can significantly increase the basic cost of such products. This reduces the competitive advantage for Chinese exporters which currently mostly is based on lower manufacturing cost. And that provides interesting possibilities to regulate the influx of Chinese products.

So the outlook may well be that patents and standards are taking over the role of traditional trade regulation instruments. This gives a new and challenging meaning to patents as a powerful tool against cheap Chinese imports.

DSM encountered this problem before when DSM Dyneema, the was faced with a threat against its strong ultrahigh molecular weight polyethylene Dyneema®, and used their patent against Hangzhou Pivot International Co Ltd of Hangzhou, in France to stop the Chinese. This is not merely a matter of asserting IP. It is a public policy issue to use Western knowledge based intellectual property to raise the bar for Chinese to enter the European and US market. For that same reason Europe introduced its own system of EU border protection by mirroring the US International Trade Commission's powers to stop goods from being imported in the EU by using patents for Customs to be able to halt importation.

For companies like DSM there is therefore more to intellectual property and patents than a reward for R&D investments. It becomes a public policy instrument capable of leveraging power on the world market. That's why Bush has IP on its top priority list. That is also why innovative companies like DSM will make intellectual property a key corporate policy issue.

And for a company like DSM what can it achieve in this new IP policy game if it has no access to talented inventors who will eventually enable it to play this economic power play on the world markets. DSM has shown what innovative spirit and a clever IP can achieve. And that is what we celebrate today.

Thank you for your attention.