

Marine and Maritime Inventions and Innovations

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- 6) *Examples*
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1) Marine and Maritime inventions and innovations

- ❑ An **Invention** involves creating something entirely new
 - ❑ An example could be the development of new communication means, for example, fiber cables
- ❑ **Innovation**, on the other hand, is the process of improving existing creations or finding new applications for them.
 - ❑ A typical example could be the transformation of smartphones from basic communication devices into powerful pocket computers.
 - ❑ Another example could be the development of autonomous vessels

<https://solutionshub.epam.com/blog/post/invention-vs-innovation>

The need for inventions and innovation in the marine and maritime sector

- ❑ Several challenges in the marine and maritime sector would benefit from further inventions and innovations. Some of these challenges are:
 - ❑ Reduced emission
 - ❑ Optimization of use of fuel, including safe use
 - ❑ Safe transfer from point A to point B
 - ❑ After Burning for Days, a Ship Carrying Thousands of Luxury Cars Sinks
 - ❑ <https://www.nytimes.com/2022/03/01/world/europe/ship-sinks-luxury-cars.html>
 - ❑ Personnel shortage in the marine industry
 - ❑ Cyber risk handling; cyber resilience
 - ❑ Cyberattack cost Maersk as much as \$300 million and disrupted operations for 2 weeks;
<https://www.latimes.com/business/la-fi-maersk-cyberattack-20170817-story.html>
 - ❑ Reduced vessel motions to reduce waiting on weather
 - ❑ Reduced loss of containers
 - ❑ Efficient handling in port

2) An Invention

□ How are inventions generated?

□ By individuals

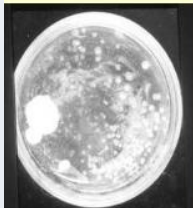
□ Drawing on a napkin? On the back of an envelope?

□ Alexander Graham Bell's Original Telephone Concept Sketch

□ During group work

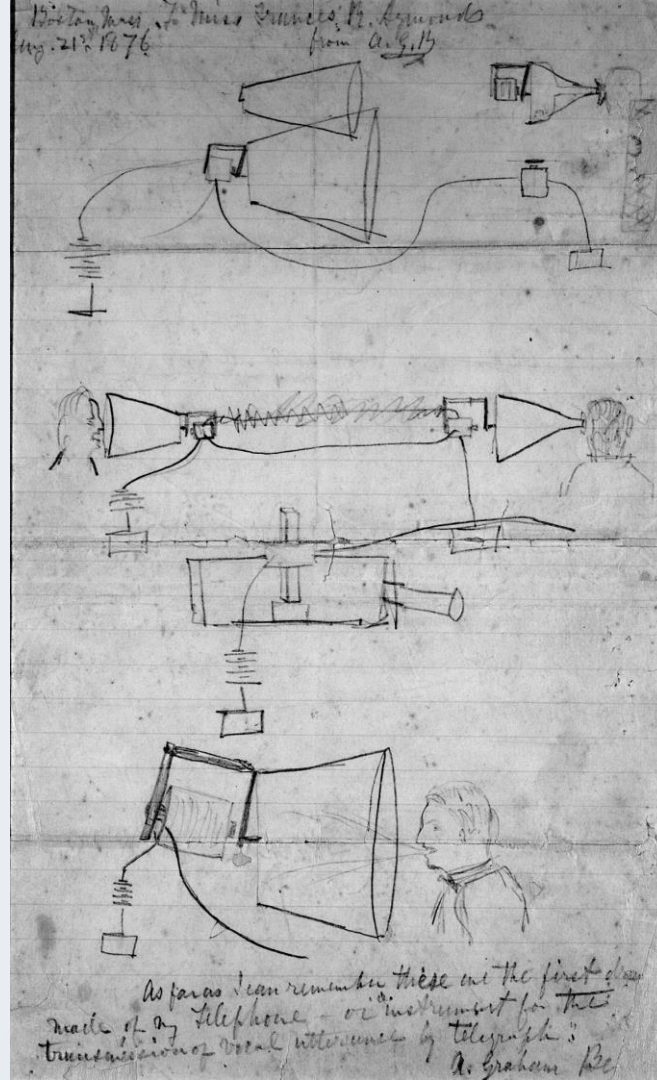
□ By chance

□ In 1928 Dr Alexander Fleming returned from a holiday to find mold growing on a Petri dish of Staphylococcus bacteria. He noticed the mold was preventing the bacteria around it from growing. He soon identified that the mold produced a self-defense chemical that could kill bacteria. He named the substance penicillin.



one of the culture plates which showed the work on penicillin (25 years old, and rather small, eh?) A

Fleming's original petri dish



3) From invention to product

- How to get from an invention to a product**

Realism checking

- Is your invention realistic?
 - Will it work?
 - Does anybody need the product/ method
 - Will the invention be of benefit to somebody?
 - Is safety during the operations ensured?
 - Will there be a market?
 - How to protect the invention?
 - Patent? (Note that patents are granted for a limited time)

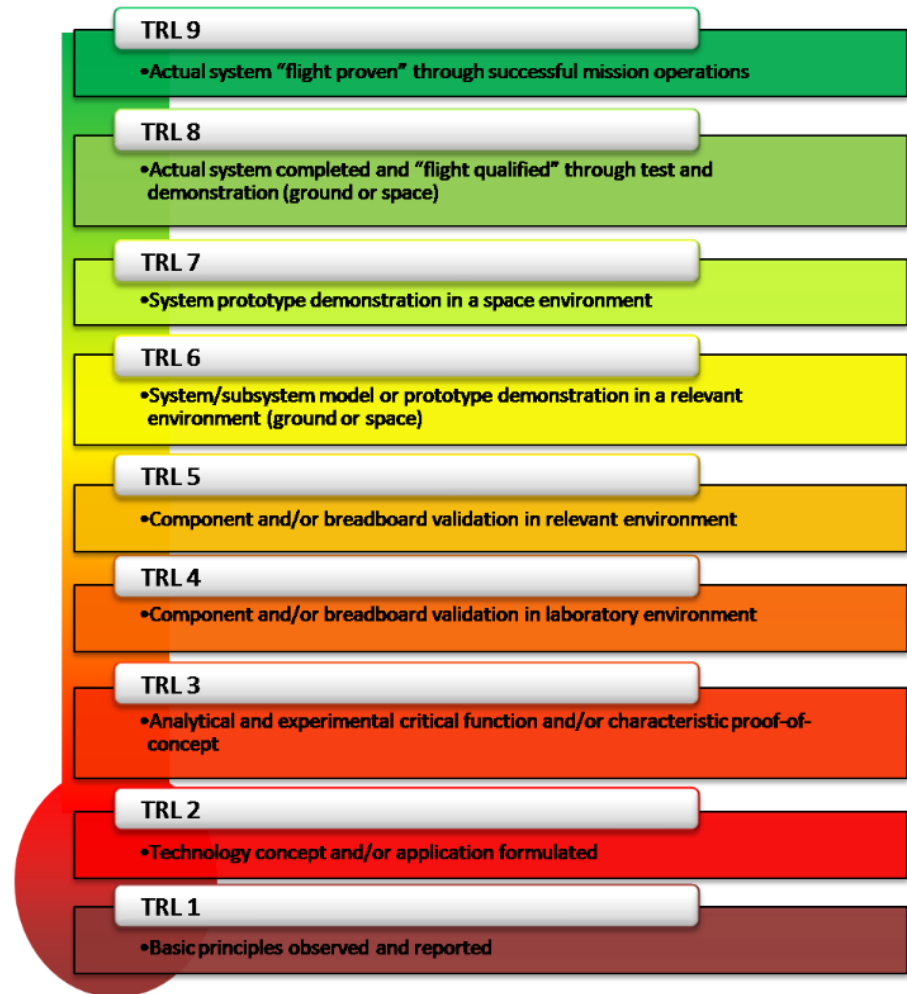
Intellectual property; Apply for Patent

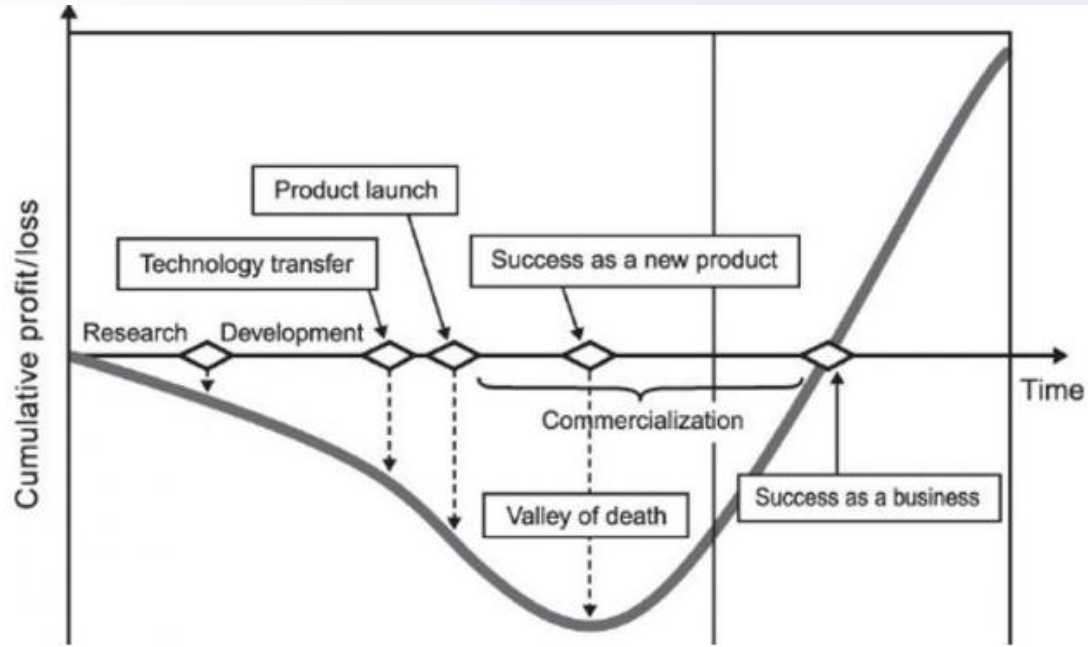
<https://www.patentstyret.no/patent#er-patent-riktig-beskyttelse>

- 1. What can you protect by a patent?
 - A patent protects a specific solution to a technical problem. You can get a patent for an invention. You can get a patent for technical products, methods, or applications if the invention is new, involves an inventive step, and can be reproduced.
- 2. What can't be patented?
- 3. Why should I apply for a patent?
- 4. Avoid infringing on the rights of others
- 5. Is a patent the right protection?
 - Keep in secrecy, publication, design registration, or trademark protection
- 6. Requirements for obtaining a patent
- 7. Keep your idea secret before submitting your patent application
- 8. All about the application process
- 9. Have you invented something in connection with work

Technology readiness level, TR

- ❑ Beware of the technology readiness level of your invention
- ❑ <https://www.nasa.gov/directorates/somd/space-communications-navigation-program/technology-readiness-levels/>





Dødens dal. Kilde: Osawa and Miyazaki (2006)



Osawa, Y., & Miyazaki, K. (2006). An empirical analysis of the **valley of death**: Large-scale R&D project performance in a Japanese diversified company. *Asian Journal of Technology Innovation*, 14(2), 93-116.
doi: 10.1080/19761597.2006.9668620

<https://panorama.himolde.no/2017/03/23/livet-i-dodens-dal/>

Ethics, sustainability and the environment

- Technical inventions that violate human dignity are exempt from patenting for ethical reasons.**
- Biological material that you find in its natural environment should be considered discoveries that cannot be patented.**
- An invention or an innovation SHOULD represent a sustainable use**
 - Pollutions from the invention/ innovation must be considered**
 - Include the fabrication phase, the operation phase, and the decommissioning phase**

4) From an innovation to a product

- Will the innovation infringe upon somebody's IPR rights?
- Is your innovation a step forward?
- Will it work?
- Does anybody need the product/ method
- Will the innovation be of benefit to somebody?
- Is safety during operations secured?
- Will there be a market?
- How to protect the innovation?
 - Can you apply for a patent?
 - If you improve on a patent owned by your company / yourself, it is suggested to apply for a new patent.

5) Specific considerations; Legal aspects

- ❑ Are there any legal restrictions?
 - ❑ Will you be allowed to implement the invention?/ the innovation?
 - ❑ Example: There are severe discussions on the legal aspects of autonomous vessels
 - ❑ A test: Will an insurance company grant insurance?



Innovations and the Industry

- Check out whether innovative activities are appreciated in your organization
 - Inventions and innovations are appreciated in most companies
 - Many companies are based on their patents and the business idea is to sell patented items
 - Some companies present a wall of fame, listing their patents with the name of the inventor included
- Who will pay for the patent application and the patent fees?
 - A patent by an employee is the property of the organization
- NOTE: In Norway, a patent does NOT give you any credit when transferring to an academic position
- Applying for patents will normally require a large involvement, you need company approval to use your time for such activities

Innovations and the Academia

- ❑ Check out whether innovative activities are appreciated in your organization
 - ❑ Even if the Academic organization is open and innovative, you may not be judged on these slogans.
UiS: “We will be an open and innovative university that promotes high quality in all parts of the organization. Our societal mission is higher education, research, academic and artistic development work, dissemination, and innovation”.
- ❑ Who will pay for the patent application and the patent fees?
 - ❑ In principle a patent by an employee (also PhD student) is the property of the Academic organization
- ❑ NOTE: In Norway, a patent does NOT give you any credit when applying for an academic position
 - ❑ If you are a postdoc or an associate professor, you may never get a promotion if you have several patents but few research papers.
- ❑ Applying for patents will normally require a large involvement

6)The importance of patents and innovations.

Example: Norsk Hydro

- 1900: On the brink of famine. The world could still be saved, William Crookes had said, if **nitrogen could be added to the soil**. Nitrogen is abundant in the atmosphere. The task was to find out how to produce large quantities of nitrogen at a reasonable cost.
- On February 20, 1903, Professor Birkeland submitted a patent application for “Ways of using electricity to produce nitrogen from the air and other gas compounds.” This is considered patent number one for Norsk Hydro.
- Sam Eyde was the investor and businessman to implement Birkeland’s ideas
- 1900 - 1917 | Hydro
- The most important invention from Norway:
 - <https://www.forskning.no/landbruk-store-vitenskapsfolk/norges-viktigste-oppfinnelse-karet/769883>



The importance of patents and innovations.



- ❑ Example: my Uncle Ragnar, 1911 – 2017
 - ❑ Ragnar Gudmestad; Graduated as a mechanical engineer from NTH (Now NTNU) in 1935
 - ❑ VP of Research and Development at Artos Engineering Company and Lakes Precision (a division of Artos) for over 60 years.
 - ❑ He had 30 patents to his name.
 - ❑ His task after normal retirement age was to **ensure that the company's patent portfolio at any time was updated and secure**
 - ❑ He finally retired in 2014 at the age of 103.



7) Questions?

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