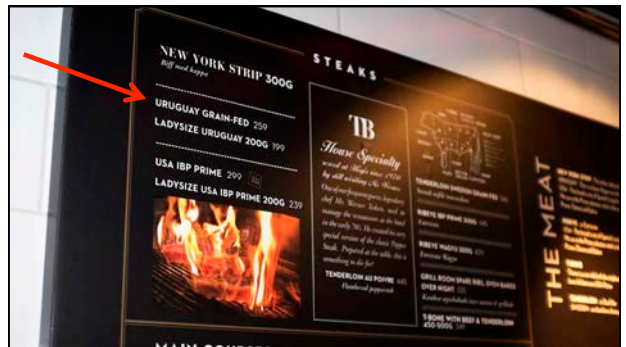


The farmer's problems



“Insects pose a great risk to food production, often causing the loss of entire crops and destroying about half of all harvested food in storage.”

International Centre of Physiology and Ecology (ICIPE), Kenya

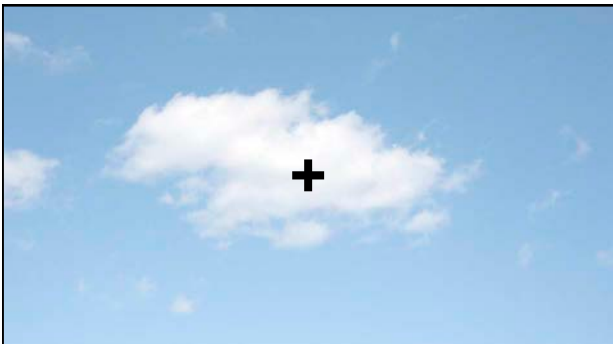


The big challenges



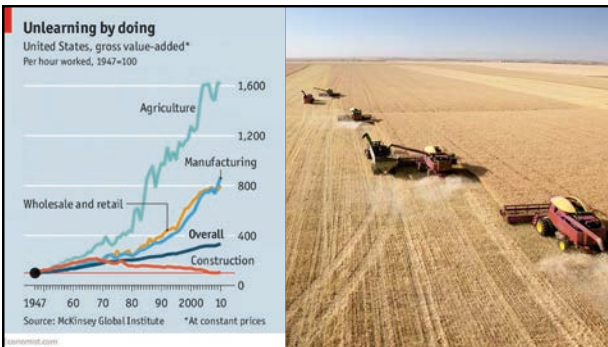
“Nearly 800 million people went hungry on the planet last year because they simply could not afford to feed themselves.”

Francis Mwanza, World Food Programme, in The Guardian, October 2017





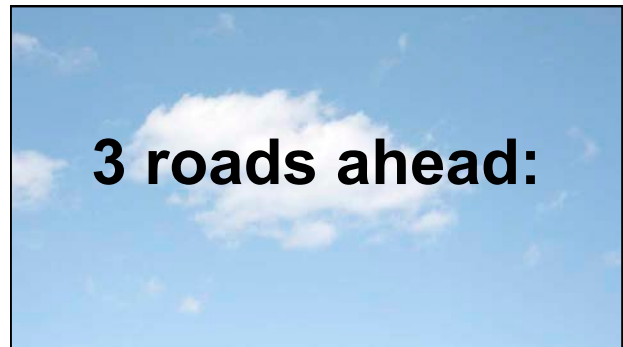
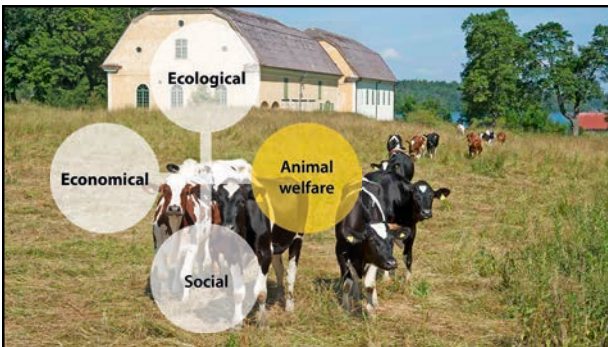
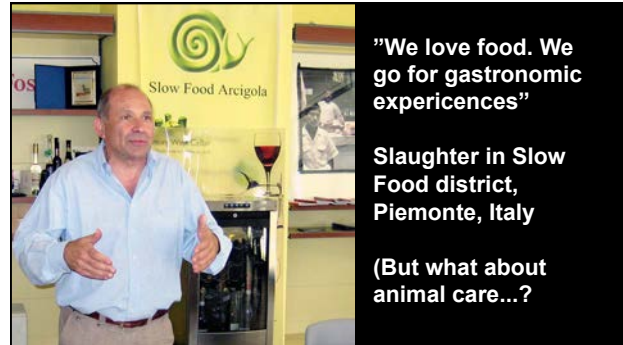
Can we handle these challenges?



But:

**"Unfortunately, some of the productivity growth has meant that we have harmed the environment, for example, by consuming more humus than we add."
Lars Askling 21 June 2018**

Sustainability?





2. Imitation

“Begin with something that someone else already had done relatively recently”

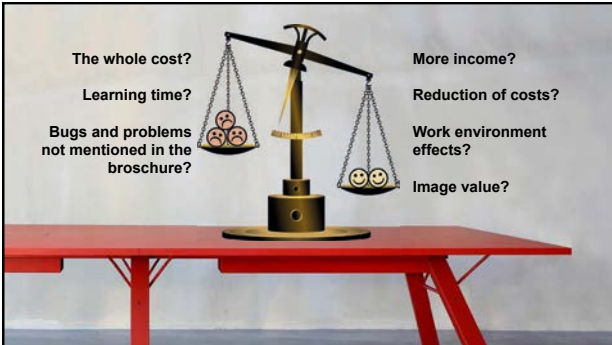


Bryce Ryan och Neal Gross
 “The Diffusion of Hybrid Seed Corn in Two Iowa Communities”
 1943

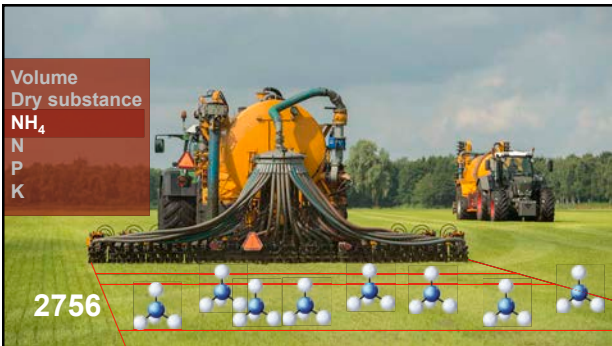


Gabriel Tarde
 “Les lois de l’imitation”
 1890





2. Innovation



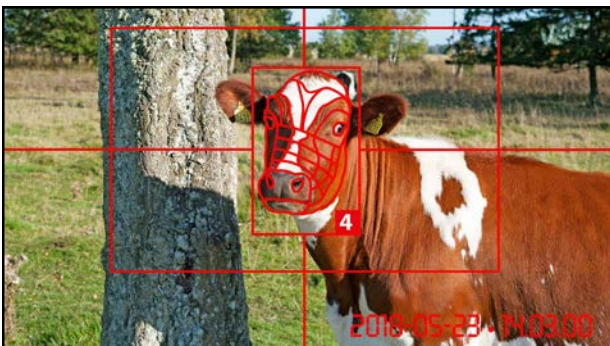
The 5th Era?



New dronebased sensors



Big data + AI



See and spray concepts



Agrifac
April
2018



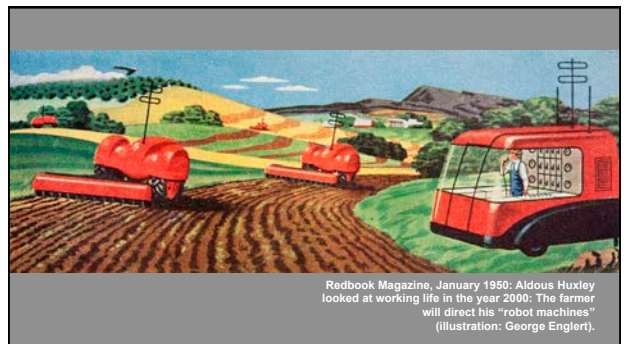
Jan
Sandberg
Envirologic



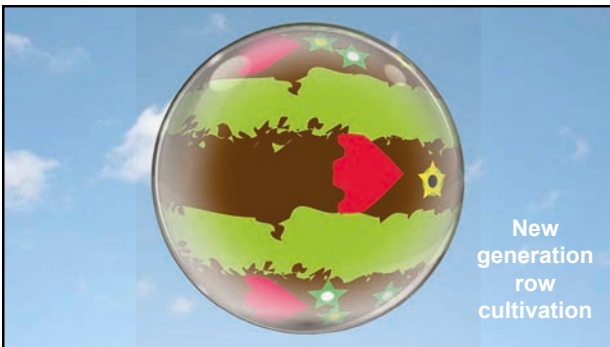
Yes,
they are
coming



Lely's
manure
scraper

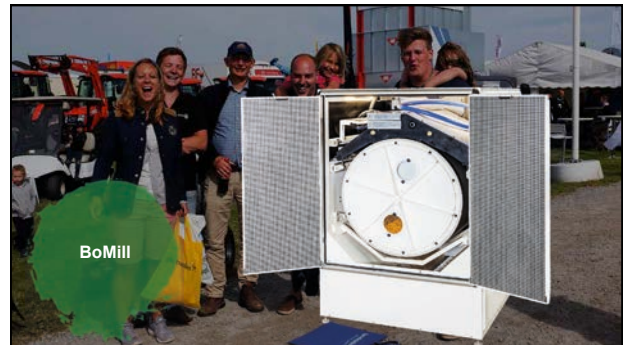


Redbook Magazine, January 1950: Aldous Huxley looked at working life in the year 2000: The farmer will direct his "robot machines" (illustration: George Englert).



Precision is not only related to soil or plants





**Decision precision:
Saving time, winning business**



**Digital revolution:
The Lely case**

First Astronaut robot (ca 1986):
80 % of patents about hardware,
20 % about software.

Astronaut A4 (20 years later):
20 % of patents about hardware,
80 % about software.

Source: https://issuu.com/bookela/docs/lely-boek-eng_korte_versie

**But digital data
is not everything**

**Mechanics
matters!**

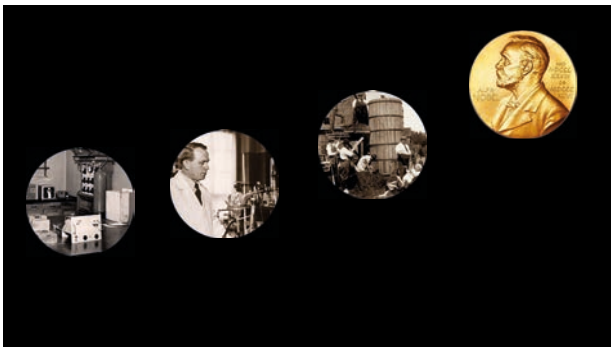


**Humans
matters!**



Innovation?

“Initiate the development of something fundamentally new and then brings it successfully into use”



What, really, is innovation?

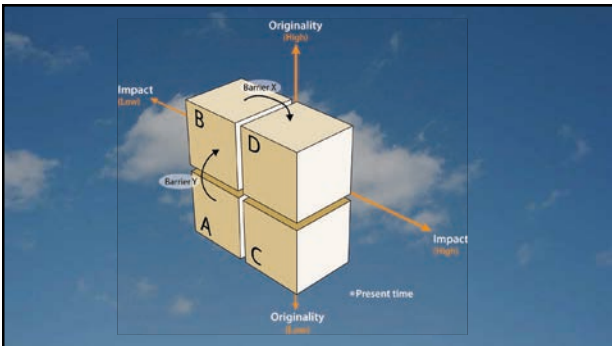
Joseph Schumpeter 1912:

**“You can make as many
improvements
as you wish of this...**

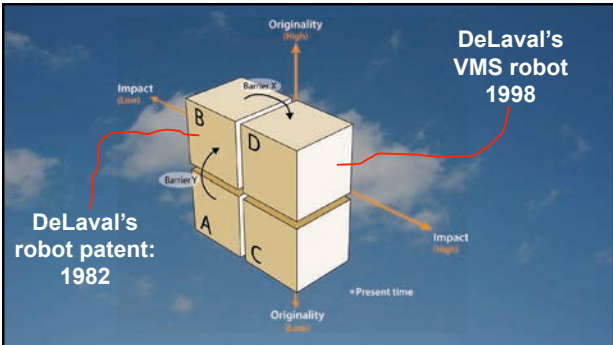
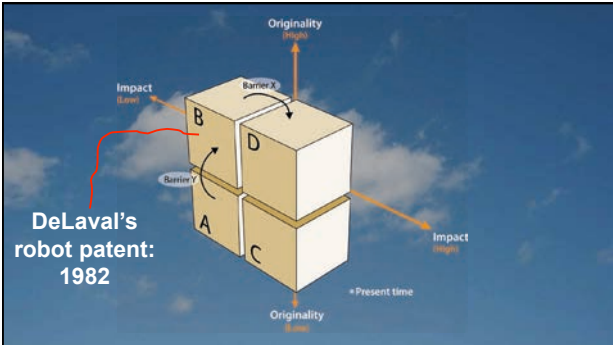


...but you will never get this

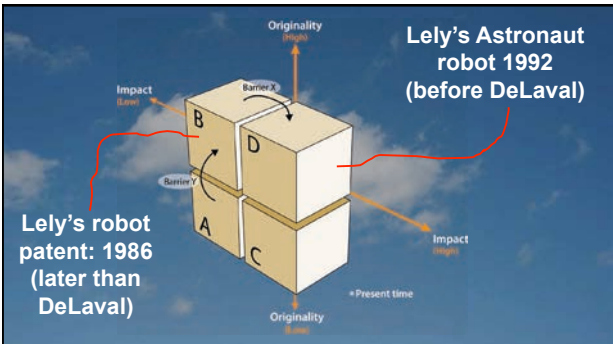
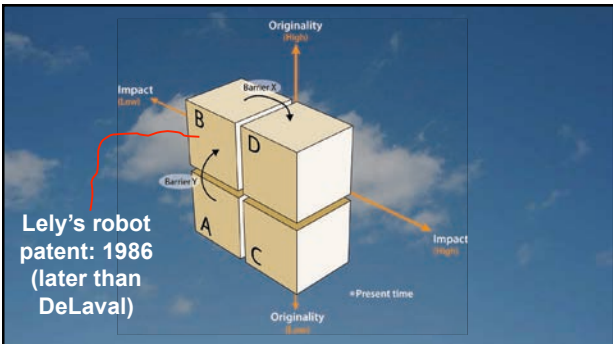




The DeLaval case



The Lely case





The DeLaval V300 robot case:

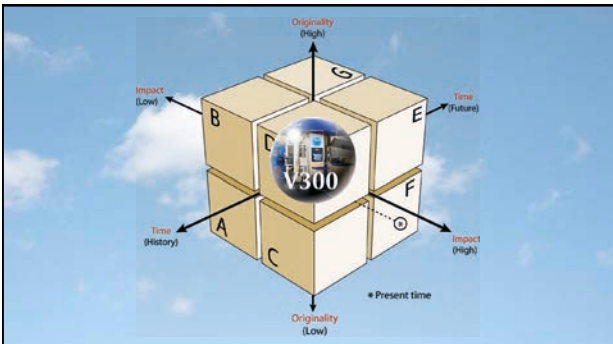


3D camera + new image analysis software allows new cow to be milked without first calibrating

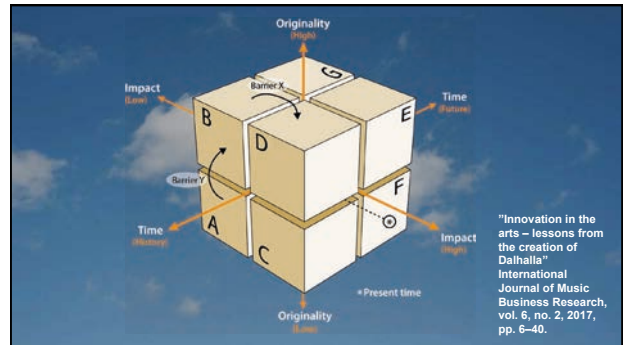
The time from congestion into the machine until milking is 46 percent faster – increases overall efficiency + 10% and decreases animal stress.

New teat cups, translucent for easier inspection of cleaning needs.

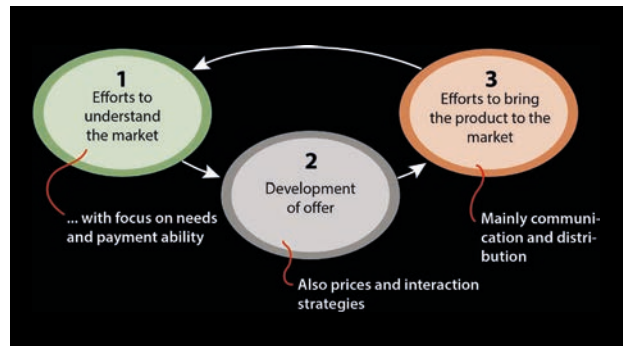
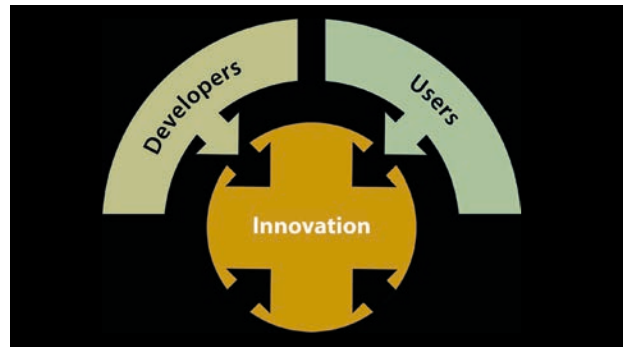
The operation of the system can be done directly from the mobile phone thanks to new software

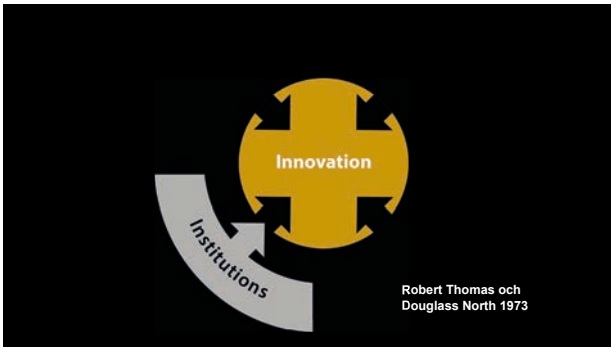


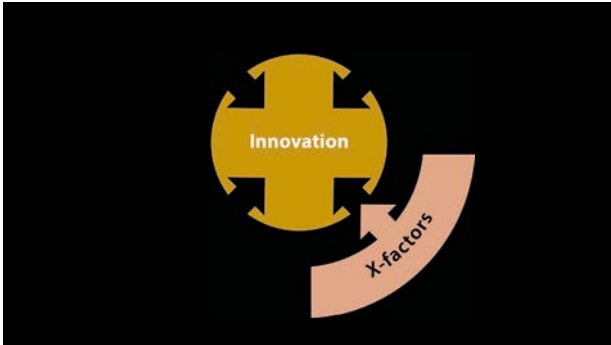
“One can have the best invention, but not having the response of customers.”
Henrik Persson, System manager for VMS, 18 July 2018



4 factors





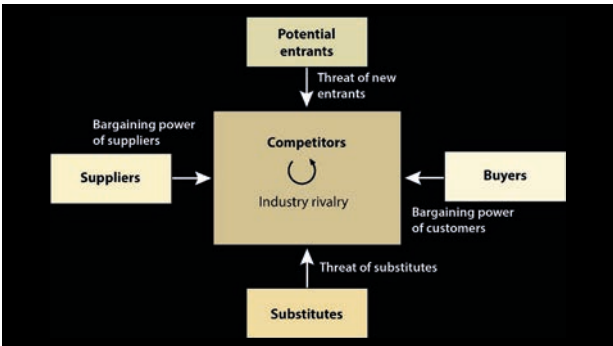


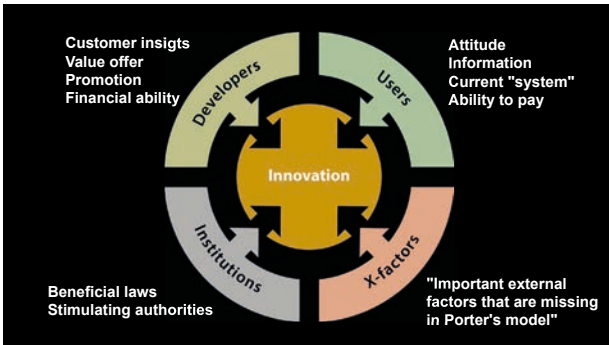
“The banana alarm 2013 affected the whole eco segment”

Cecilia Ryegård, Ekoweb 7 February 2018

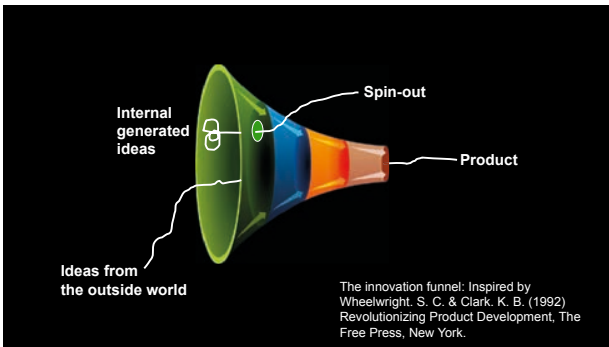


When Astrid Lindgren had her 80th birthday in 1988 the Swedish Government, as a gift, promised that all milking cows must have access to pasture in summer time

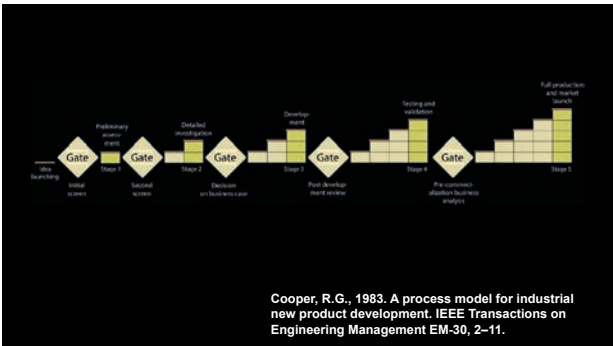


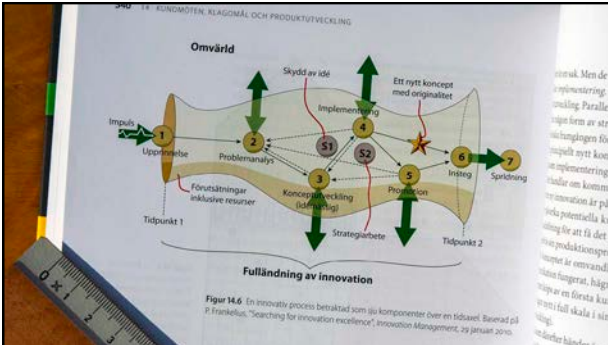


Innovation management



Deere & Co generated 2000 patent each year, but only 250–500 were used.





Successful innovation (as well as imitation) is a matter of...



Example

The DeLaval timeline 'Innovation is in our DNA' highlights key milestones:

- 1813: Separator. Gustaf de Laval patents the separator.
- 1816: Lantmannen magazine.
- 1820: First separator patent.
- 1827: First separator patent.
- 1830: First separator patent.
- 1833: First separator patent.
- 1837: First separator patent.
- 1840: First separator patent.
- 1843: First separator patent.
- 1846: First separator patent.
- 1849: First separator patent.
- 1852: First separator patent.
- 1855: First separator patent.
- 1858: First separator patent.
- 1861: First separator patent.
- 1864: First separator patent.
- 1867: First separator patent.
- 1870: First separator patent.
- 1873: First separator patent.
- 1876: First separator patent.
- 1879: First separator patent.
- 1882: First separator patent.
- 1885: First separator patent.
- 1888: First separator patent.
- 1891: First separator patent.
- 1894: First separator patent.
- 1897: First separator patent.
- 1900: First separator patent.
- 1903: First separator patent.
- 1906: First separator patent.
- 1909: First separator patent.
- 1912: First separator patent.
- 1915: First separator patent.
- 1918: First separator patent.
- 1921: First separator patent.
- 1924: First separator patent.
- 1927: First separator patent.
- 1930: First separator patent.
- 1933: First separator patent.
- 1936: First separator patent.
- 1939: First separator patent.
- 1942: First separator patent.
- 1945: First separator patent.
- 1948: First separator patent.
- 1951: First separator patent.
- 1954: First separator patent.
- 1957: First separator patent.
- 1960: First separator patent.
- 1963: First separator patent.
- 1966: First separator patent.
- 1969: First separator patent.
- 1972: First separator patent.
- 1975: First separator patent.
- 1978: First separator patent.
- 1981: First separator patent.
- 1984: First separator patent.
- 1987: First separator patent.
- 1990: First separator patent.
- 1993: First separator patent.
- 1996: First separator patent.
- 1999: First separator patent.
- 2002: First separator patent.
- 2005: First separator patent.
- 2008: First separator patent.
- 2011: First separator patent.
- 2013: First separator patent.

One day in May 1877 Johan Fredrik Lagergren at Klosters järnbruk invited some friends to a dinner. He then showed No 16 of the german magazine Milchzeitung. In one article a new separation machine was presented . The inventor was Wilhelm Lefeldt. Gustaf de Laval became interested..

1864 Antonin Prandtl – Germany
1879 Reverend H. F. Bond – U.S.
1874 Wilhelm Lefeldt – Germany
(and partner Carl Lentsch)
1878 Alpha Laval Separator Company

One thing is clear

