Dinosaur-projects – characteristics

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DINOSAUR PROJECTS

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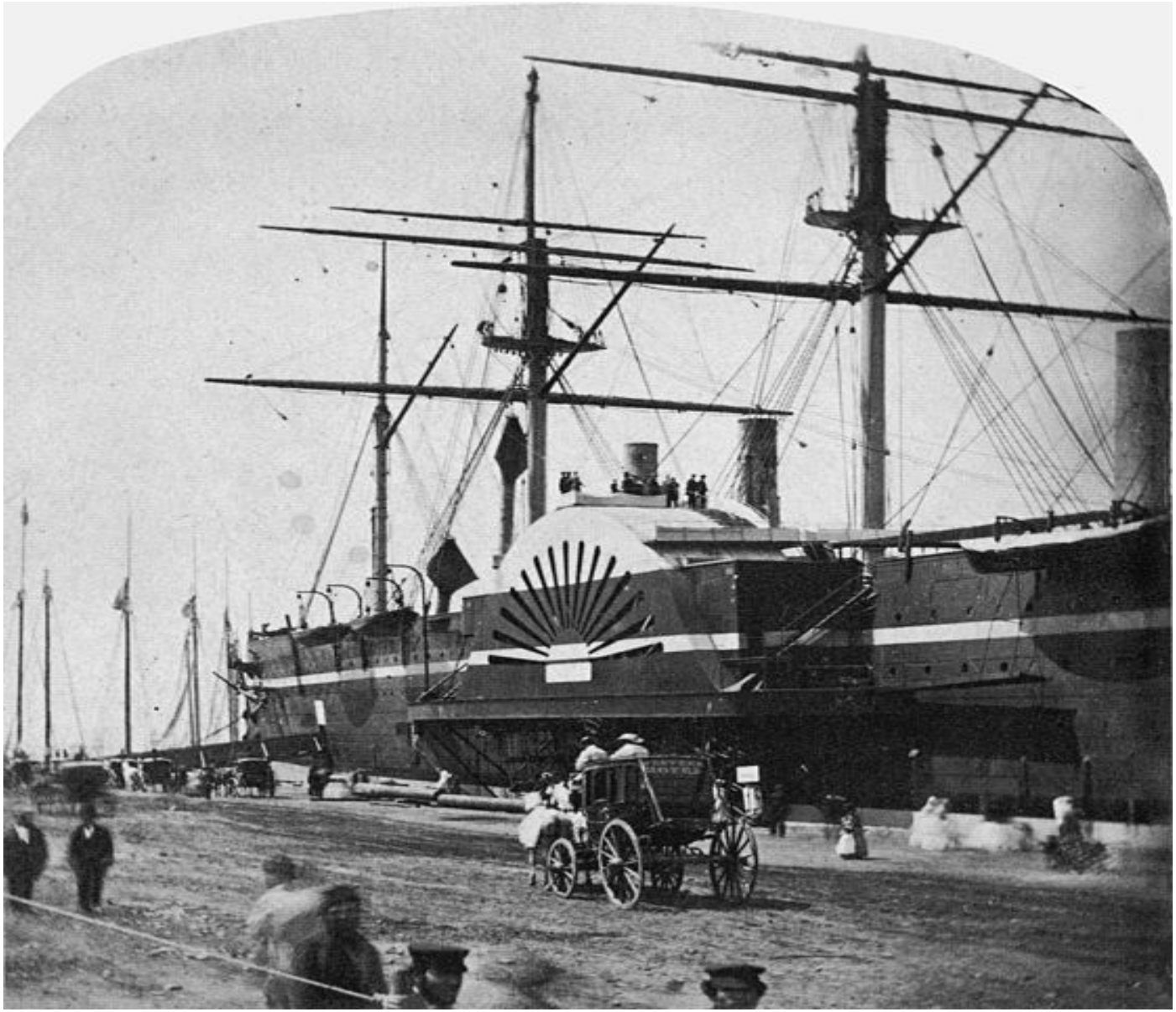
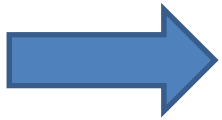
Case 1: The Great Eastern



The Business Case

- The 1850´s were an era of free trade
- Economic growth and general optimism in the British Empire and the United States
- Population growth, increasing emigration to North America. Gold rush in California.
- Gold rush in Australia, making even that continent desirable for European emigrants

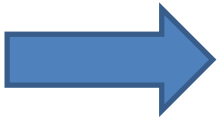


Strong growth in the demand for tonnage to be expected

Supplywise: Many small ships or fewer, but bigger?

- Constructor Isambard Brunel: With increasing size the costs will go up by the square, but the loading capacity by the cubic

- And the technology for riveting together big constructions is at hand, drawing on experience from rail and bridge construction

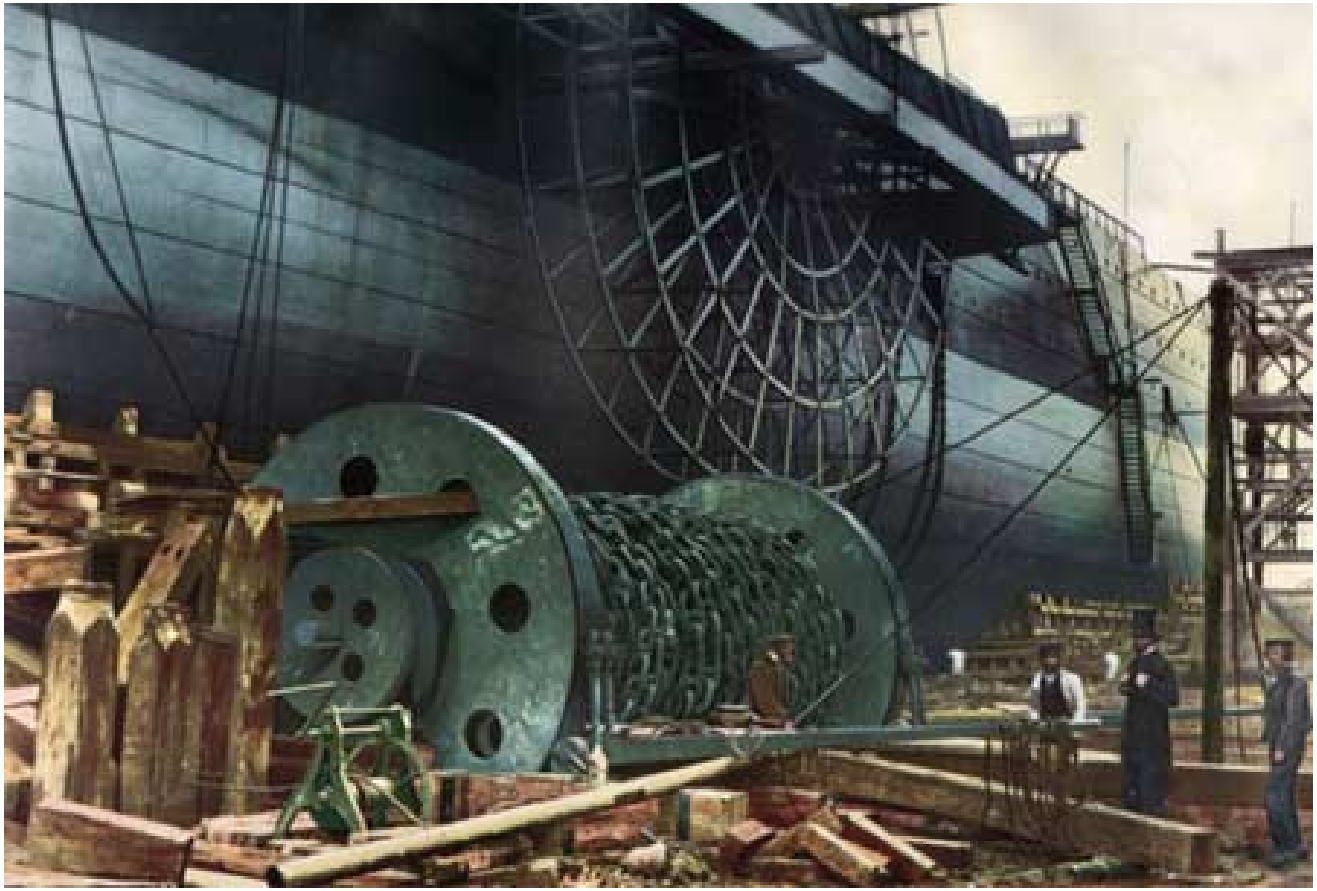


A ship five to six times bigger than anything made before is feasible

Some key figures

- Tonnage: 18 915 grt.
- Propulsion: Five steam engines rated at 8000 hp. combined. In addition six masts for sailing.
- Speed: 14 knots
- Capacity: 4000 passangers
- Complement: 418
- Launched: 1858
- Broken up: 1889-90

Problems…..



…related to size and technology employed.

- First attempts at launching failed
- Very little sailing was possible due to the danger of fire from the funnels´ hot ashes when steaming
- The technology of integrating dual prop shafts was in its infancy. Thus only one propeller was fitted, supplemented by paddles.

- Paddles were unsuited for North Atlantic conditions. In a gale one paddle was lost and the other smashed by the sea, the rudder came loose and hit the propeller.

- On one of the approaches to New York the captain was determined to avoid Sandy Hook off Staten Island and opted for Long Island Sound, running aground there instead

- Manual steering of such a big vessel was very demanding. Power steering was retrofitted in 1867 upon the invention of this device.

Economics….

- North Atlantic passenger sailings commenced in 1860, but were discontinued in 1863 and the ship laid up. The determining factor was price competition from other shipping companies operating smaller ships.

- Having incurred costs to the owners of more than half a million pounds, the ship was sold at auction in 1864 for 25 000 pounds.

- The Great Eastern was then converted to lay telegraph cables across the North Atlantic and in the Indian Ocean. These operations were technically a success and economically feasible due to the low acquisition cost of the vessel.

- In 1876 there were no more cables to lay, and the ship was laid up again.

- She was then used as a showboat, a concert hall and for advertising the goods of a department store, sailing up and down the Mersey River. A few of these efforts to squeeze out some extra money were profitable, the last attempts were not.

- Even the shipbreakers lost money. They thought they had made a good deal, but the rugged construction turned out to be much harder to tear apart than expected.

Case 2: The ”Dora-Gerät”

Objective

To destroy the most heavily fortified parts of the Maginot line in a future conflict with France

Some key figures

- Calibre: 80 cm / 31.5 inches
- Weight of projectile (armour piercing): 7.1 tons
- Weight of gun total: 1 350 tons
- Range (heavy charge): 47 km.
- Developed: 1934-35
- Produced: 1937-41
- Number produced: 2

Operational history

- The gun was not completed before the fall of France in 1940.
- In June 1942 one of the guns saw action for the first and only time, during the siege of the Soviet fortresses in Sebastopol in the Crimea.
- Deployment was considered on a few occasions later in the war, but the plans never came to fruition.

The Sebastopol Operation

- Five trains with ca. 100 railcars were necessary to transport the dismantled gun, ammunition, gun crew, anti aircraft pieces including crews and other support units.
- Another three to four trains were required for the transportation of cranes, railway track material and engineering units with the tasks of preparing the shooting position and assembling the gun.
- Altogether, about 5000 men were employed.

- The gun fired a total of 48 shots. Many other heavy units were also in action, which made it difficult to ascertain the impact of the ”Dora” unit specifically. The only result that could be ascribed to the ”Dora” with absolute certainty was the obliteration of an enemy ammunition depot 30 meters below the ground.
- One high ranking German officer noticed that the 400 ton barrel ”did not look good” after only 15 shots. After the operation it had to be replaced.

Economics

- Pecuniary cost is relatively uninteresting in a command economy at war. Opportunity cost is more relevant.

- On the Eastern Front the Germans suffered a perpetual lack of manpower, tanks and logistics capacity. When the Soviets through hard experience learned how to operate strategically and tactically wise, the war was lost for Germany, for the USSR was vastly superior in the number of men, tanks and logistics units.

- The German commanders at Sebastopol were uneasy at learning the extent to which their scarce resources were consumed by a single gun.

- Back in Germany the manufacturer, Krupp, could alternatively have developed and produced tank guns, anti-tank guns and other weapons that were in critical short supply at the front.

- Or, the resources could have been allocated to the development of a heavy bomber plane. The British had bombs weighing up to 10 tons which could be brought to bear on any target within a few hours of flying.

- The ”Dora” was totally unfit for defensive battle. It was vulnerable to air attacks. And there was no way of evacuating in a hurry if the enemy threatened a breakthrough. This is some of the explanation why it was never deployed again. Soon after Sebastopol the tide of the war shifted, and the Germans came on the defensive.

- Although the technical requirements regarding penetrating capability etc. were met, the overall performance was very modest when measured against the resources committed. It was the wrong project.

Case 3: The Convair B-36

Objective

In case of the fall of Britain in World War 2, to be able to conduct a round trip Gander, Newfoundland-Berlin, dropping a substantial bomb load over Germany.

The Design

- In April 1941 USAAC opened up a design competition for the new intercontinental bomber. The requirements were later modified somewhat. Consolidated Vultee (later Convair) was awarded the contract.
- The piece of ingenuity in the design was the wing. It was carefully designed to give maximum lift at high altitudes. The idea was for the slow giant to survive by operating out the range of German interceptors and anti aircraft guns.

- The wing span was 70 meters (more than that of a modern jumbo jet) and the wing area 443 square meters.
- The crucial leading edge was made absolutely clean by moving the engines, of which there were six, to the aft part of the wing with the propellers pushing.
- Thus, the plane obtained a service ceiling of 13 300 meters, previously unheard of in the era of piston-engined aircraft, and meeting the requirements.

But it came at a cost….

- Vibrations in the big wing meant leaks of fuel and oil, which was potentially dangerous and very annoying
- With the pusher configuration of the engines, the carburettors were exposed to cold air from the induct vents, making them prone to icing. When iced up they produced an incorrect air/fuel mix for the engines. A too lean mix could make the engine stop, a too rich one could result in exhaust fire. Three fires of this nature lead to the first loss of a US nuclear weapon.

Obsolescence at entry

- The plane flew for the first time in 1946. It was very slow, making a cruising speed of merely 370 km/h.
- In 1948 it entered service with the Strategic Air Command. The same year the Soviet MiG 15 fighter plane flew for the first time. It had a speed almost three times that of the B-36 and a service ceiling more than 2000 meters higher.
- The B-36 was nevertheless kept operational through 1959, chiefly because there was no alternative available which could carry the big and cumbersome H-bombs, combined with a range sufficient to (theoretically) penetrate deep into the Soviet Union.

Improvement efforts

- To increase speed, four additional jet engines were innstalled. The cruising speed thus went up to 650 km/h, still no match for the MiG-15.
- To further reduce vulnerability the idea came up to let the bomber carry with it its own fighter plane (!). But docking proved very difficult even for experienced test pilots, and the project plan was abandoned.
- It is interesting that the corrective actions added to the size and weight.

White Elephants or Dinosaurs?

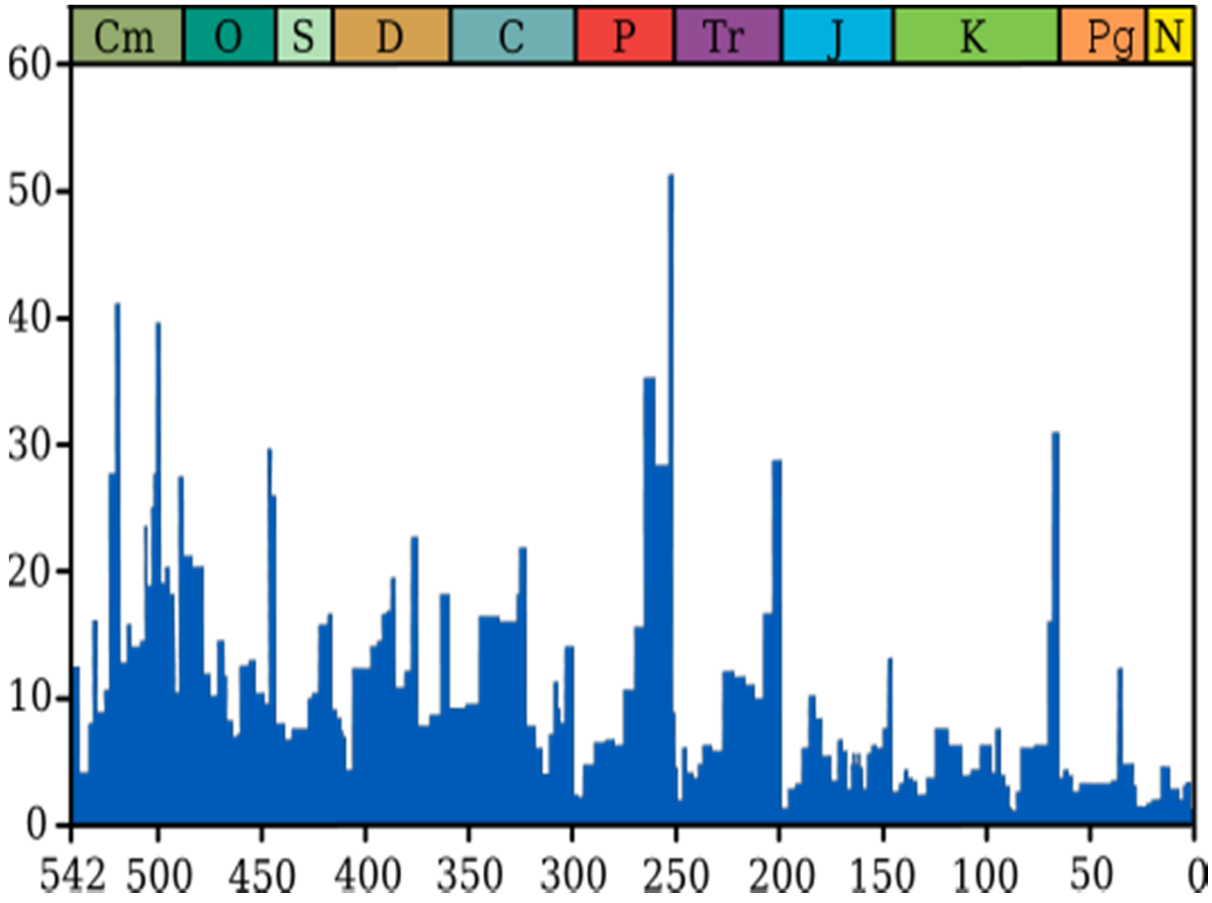
White elephants is a kind of common term for any and all projects that in retrospect are considered silly.

If we could be a little more specific when terming the different kinds of project catastrophes, chances are that we might learn more, and not only laugh.

Consider the following diagram.

Earth history – extinction intensity

(Extinction intensity in marine animal genera according to Rohde & Muller (2005), Sepkoski (2002), reedited by Wikipedia)



Dinosaur Lessons

- Changes in markets and technology provide ”extinction events” with short intervals.
- Being heavily specialized in niches within one technology or market paradigm only, is dangerous.
- Substituting size for innovation is dangerous.
- Concentrating heavily on one feature can lead to development imbalances, which are dangerous.

- Being in an ”inertia mode”, not reconsidering the project portfolio in light of observed changes in markets and/or technology is dangerous.
- Not grasping fully the significance of sunk cost is dangerous.

THANK YOU FOR YOUR ATTENTION