

Factors impacting supply and demand in boom and recession

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Demand considerations

Improving market and competitive conditions in global shipbuilding requires that both demand and supply sides are considered.

The report “*Towards a better understanding of the commercial shipbuilding market*” discussed this in some detail and suggested some possible ways that ‘exaggeration of the cycle’ could perhaps be reduced.

I don’t have much more to say on demand to add to that and would like today to **concentrate on supply**.

Supply considerations

Shipbuilding is different to almost* all other industries due to the **extreme volatility of demand**.

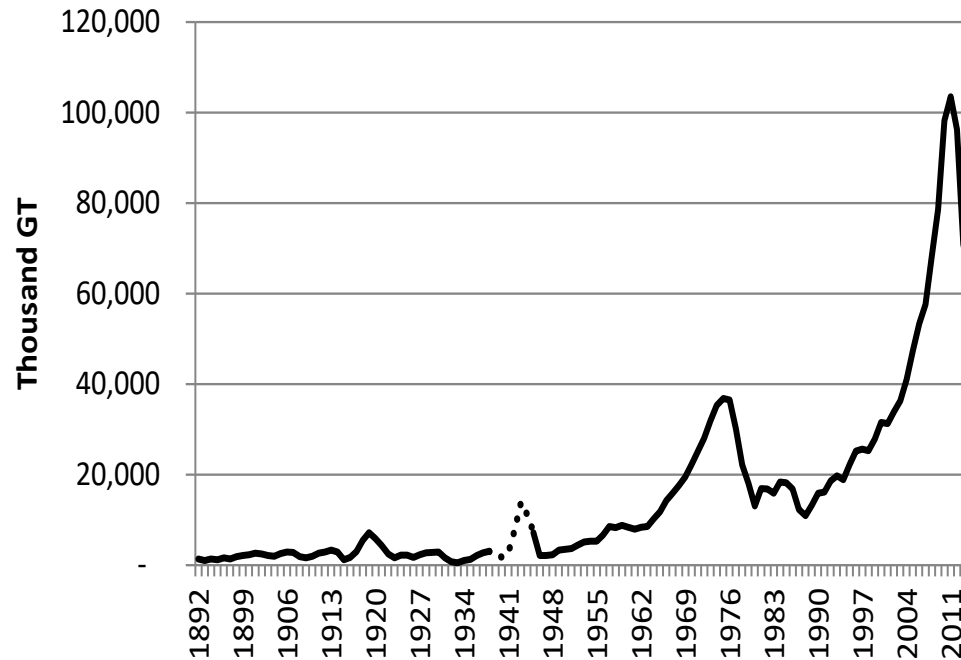
How should shipbuilding respond to this very difficult market characteristic?

Shipbuilding has to **acknowledge** this and to invest and organise itself to compete under extreme volatility.

This would be **new thinking** – every shipyard plan I have ever seen assumes increasing market or steady state.

* The steel industry faces similar volatility and cyclical characteristics in demand

The commercial shipbuilding cycles long term

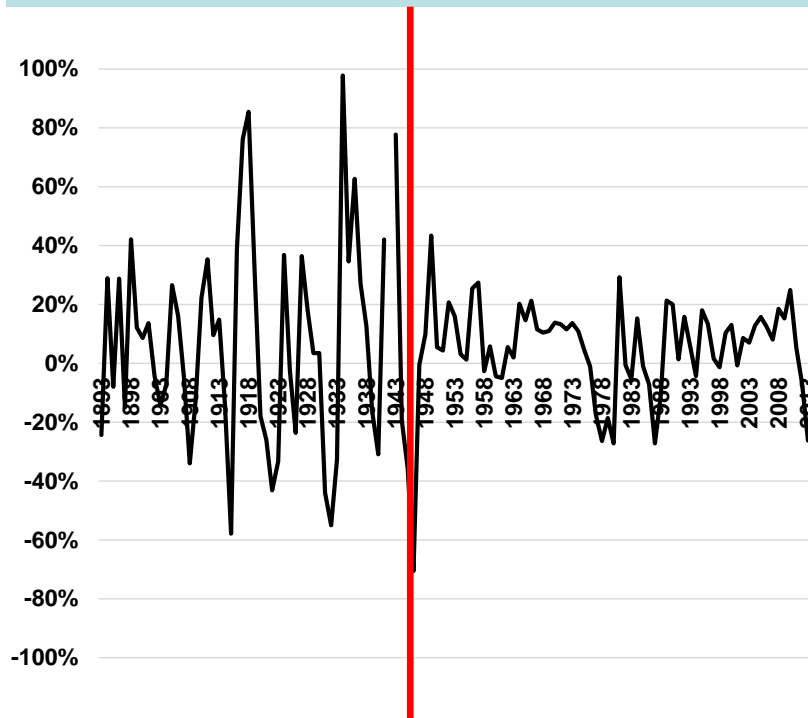


Commercial shipbuilding output (in gross tons), 1892 to 2014

Commercial shipbuilding has seen four output peaks in the past 130 years (discussed in the May 2018 report).

Competitiveness through economy of scale

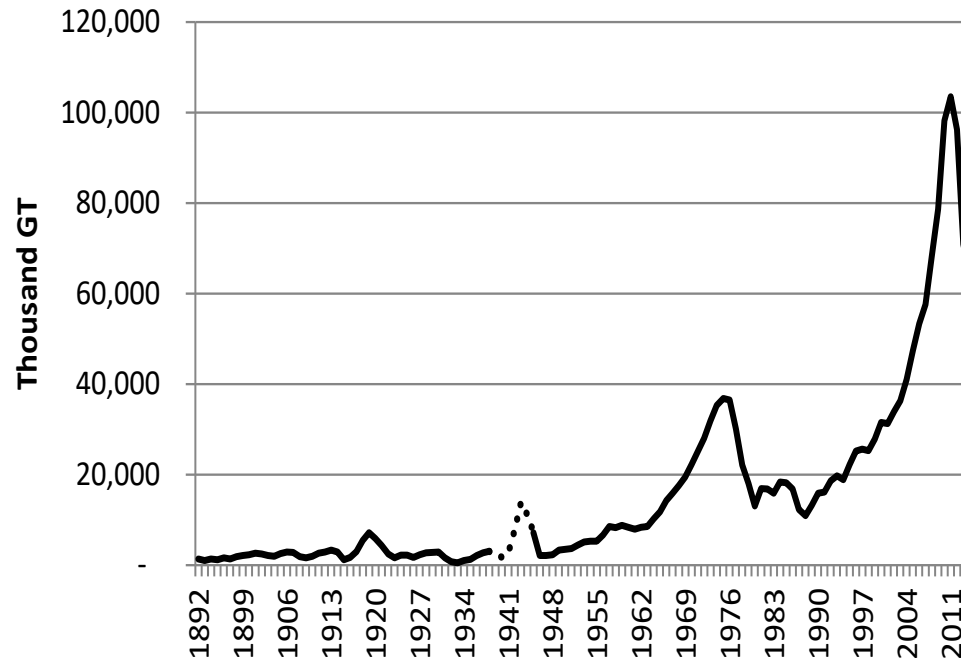
The nature of volatility in commercial shipbuilding changed significantly after WWII



This shift in volatility has had a significant effect on the way that competitiveness is pursued.

Year on year change in commercial shipbuilding output, 1893 to 2014

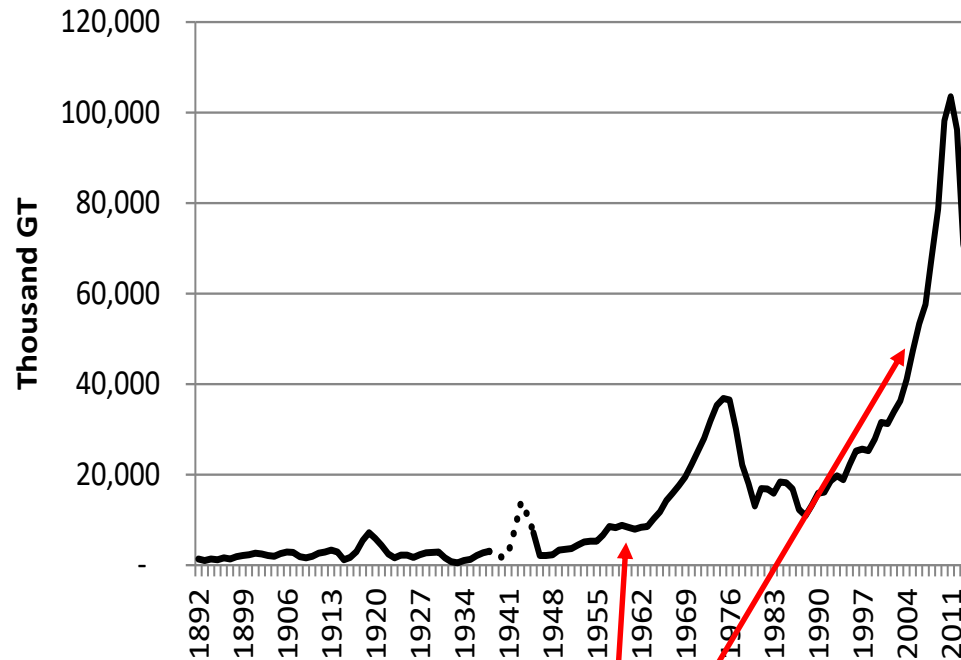
The commercial shipbuilding cycle long term



Commercial shipbuilding output (in gross tons), 1892 to 2014

Demand since WWII has seen **two long periods** of almost unbroken market growth, followed by steep collapses.

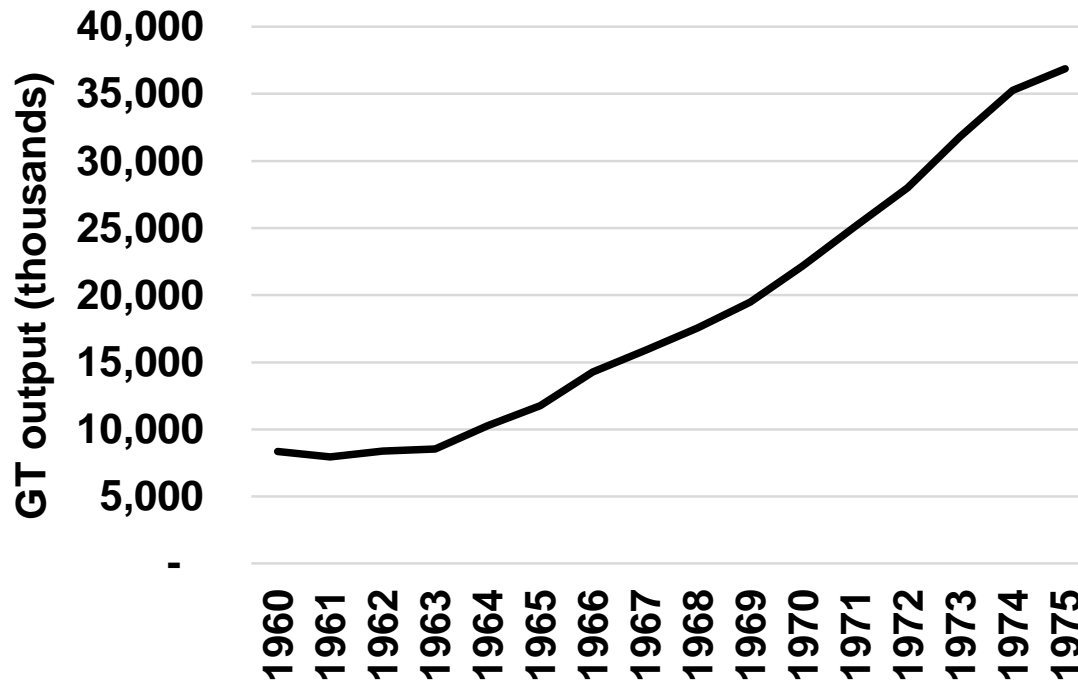
The commercial shipbuilding cycle long term



Commercial shipbuilding output (in gross tons), 1892 to 2014

Competitive strategies have responded to an “**illusion of market permanence**” that result from these extended growth periods.

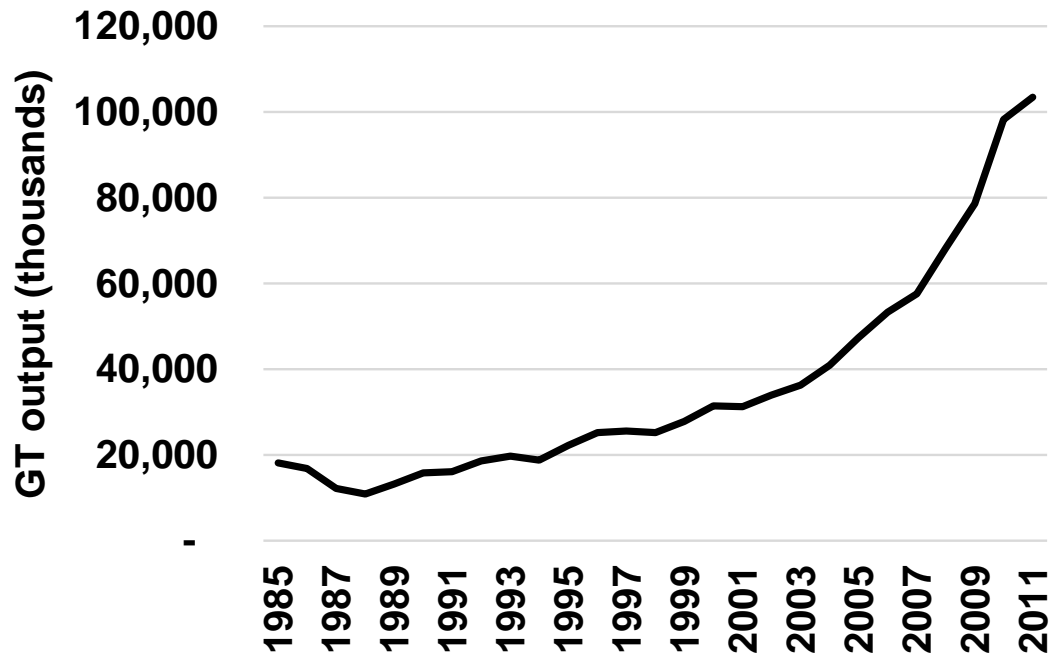
The “illusion of permanence”



10% average yoy growth for 15 years!

This is how the market looked to investors in the 1960s and early 1970s.

The “illusion of permanence”



7% average yoy growth for 26 years!

This is how the market looked to investors in the 1980s, 1990s and the ‘noughties’.

The “illusion of permanence”

Strong and sustained growth in this way may encourage a belief that the cycles have disappeared and that commercial shipbuilding has become a more steady industry.

It hasn't!

The shipbuilding industry has responded by pursuing economies of scale as part of competitive strategy:

Clarkson World Shipyard Monitor at October 2018 shows –

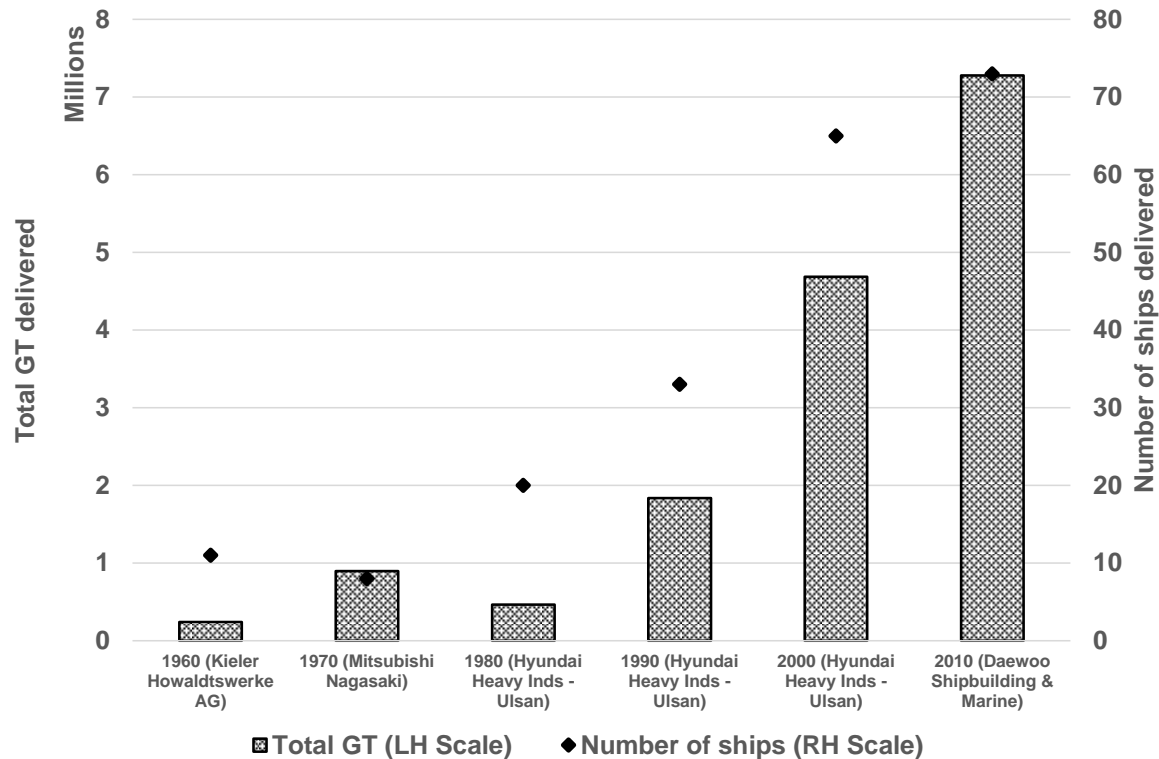
$\frac{1}{4}$ of total CGT orderbook in the 5 largest shipyards

$\frac{1}{3}$ of total CGT orderbook in the 10 largest shipyards

Capacity has become highly concentrated in market leaders

Concentration of shipbuilding capacity

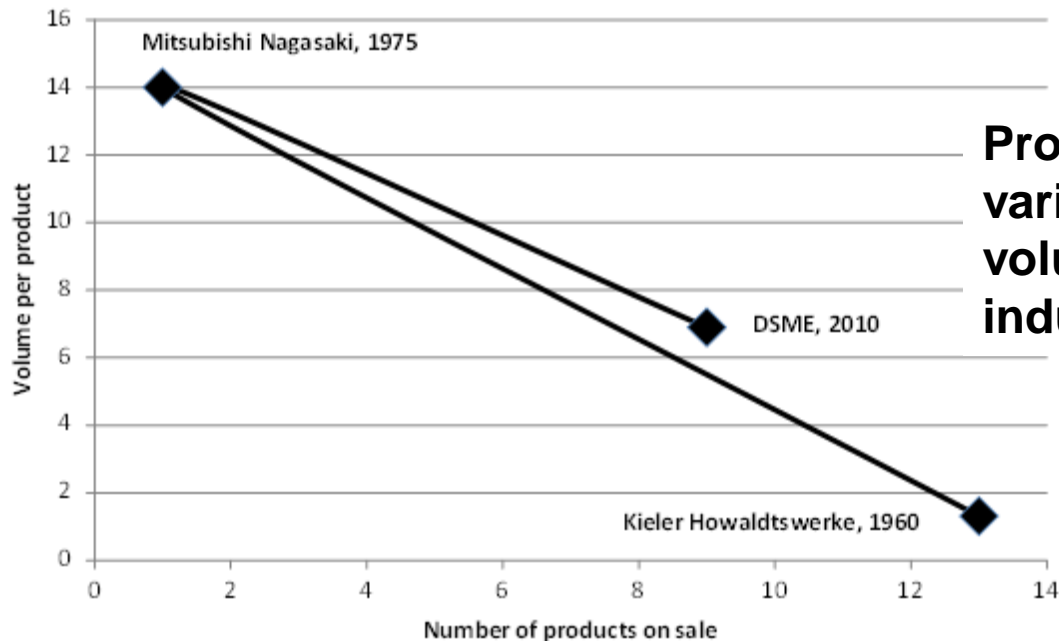
The degree of scale has been very large:



Largest commercial shipbuilders by decade

Concentration of shipbuilding capacity

Scale has been used in a similar way to developments in the automobile industry:

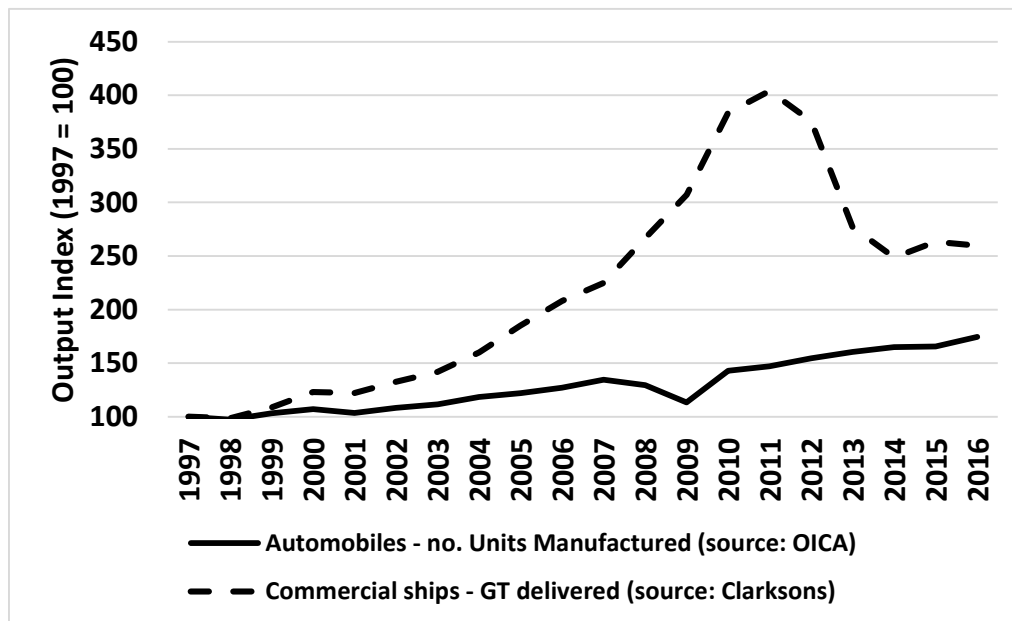


Progression of product variety and production volume in shipbuilding industry market leaders

Analysis by P W Stott, based on the methodology presented in: Womack, J.P., Jones, D.T., Roos, D. and Massachusetts Institute of Technology. (1990) *'The machine that changed the world'*. New York: Rawson Associates.

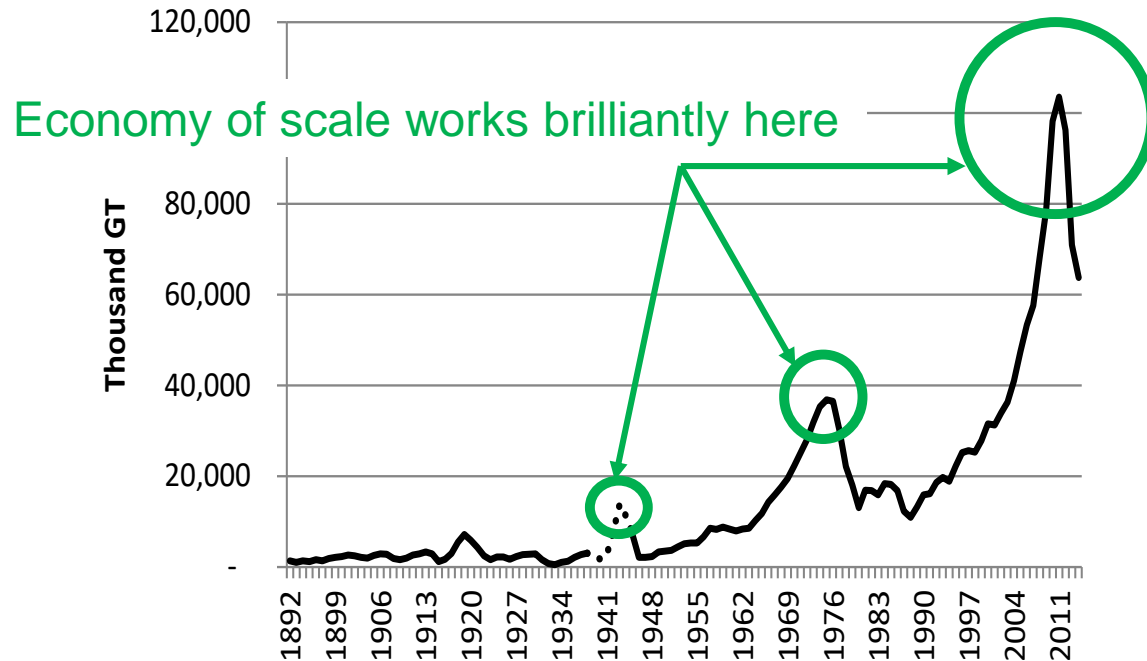
Concentration of shipbuilding capacity

Shipbuilding has essentially followed the same track as automotive but the characteristics of demand in the two sectors is very different:



The extreme cyclicality in shipbuilding leads to problems in competitiveness

The commercial shipbuilding cycle long term



Commercial shipbuilding output (in gross tons), 1892 to 2014

The problem with the **pursuit of competitiveness through economy of scale** is: how do ultra-large shipyards compete when the market turns down and cannot provide the workload they need for competitiveness?

The commercial shipbuilding cycle long term



Commercial shipbuilding output (in gross tons), 1892 to 2014

The problem with the **pursuit of competitiveness through economy of scale** is: how do ultra-large shipyards compete when the market turns down and cannot provide the workload they need for competitiveness?

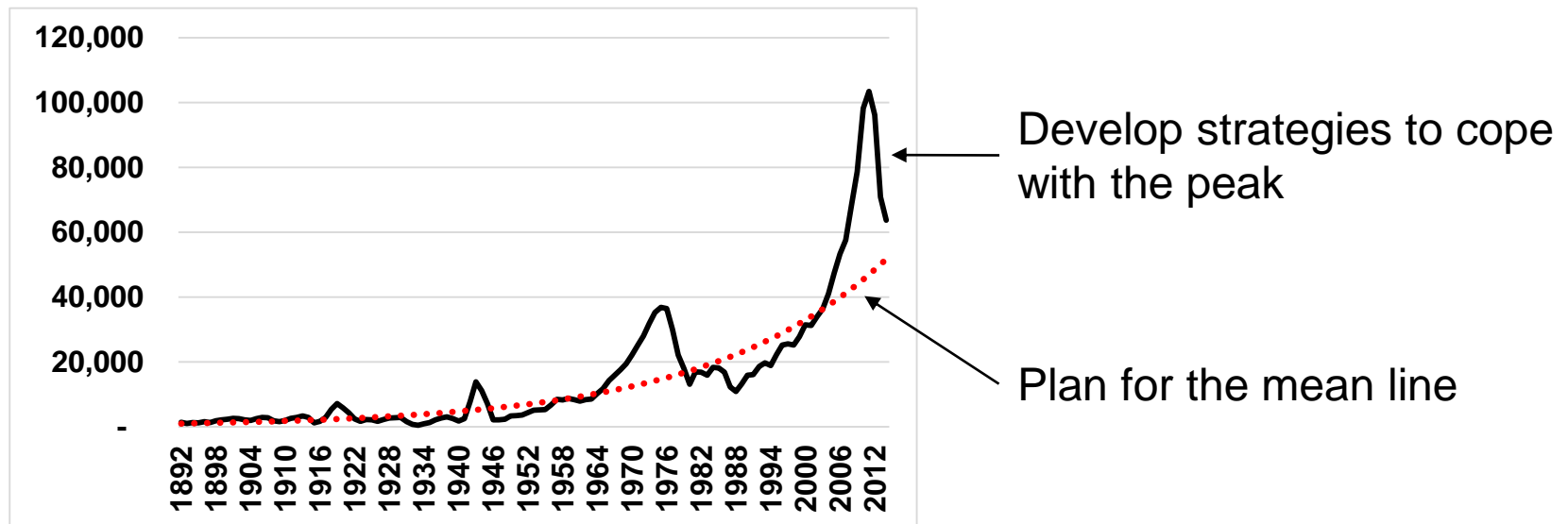
Sustainable competitiveness

To be sustainable, shipbuilding competitiveness has to be viewed over the full cycle, and not just be aimed at the peak.

Is it possible to re-engineer industry's view of the sector to try to make it more sustainable and less subject to economic problems generated by the exaggerated shipbuilding cycle?

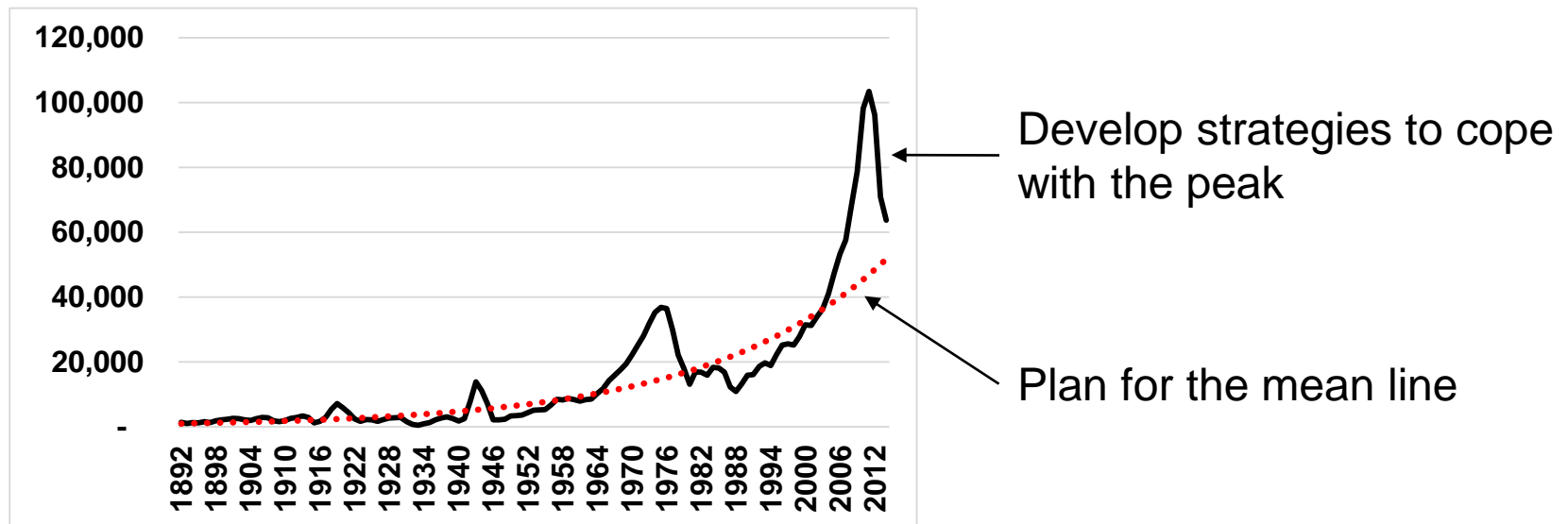
Big question

The question in commercial shipbuilding at the moment, for me, is what is the **optimal size and form of shipyard for sustainability over the full cycle?**



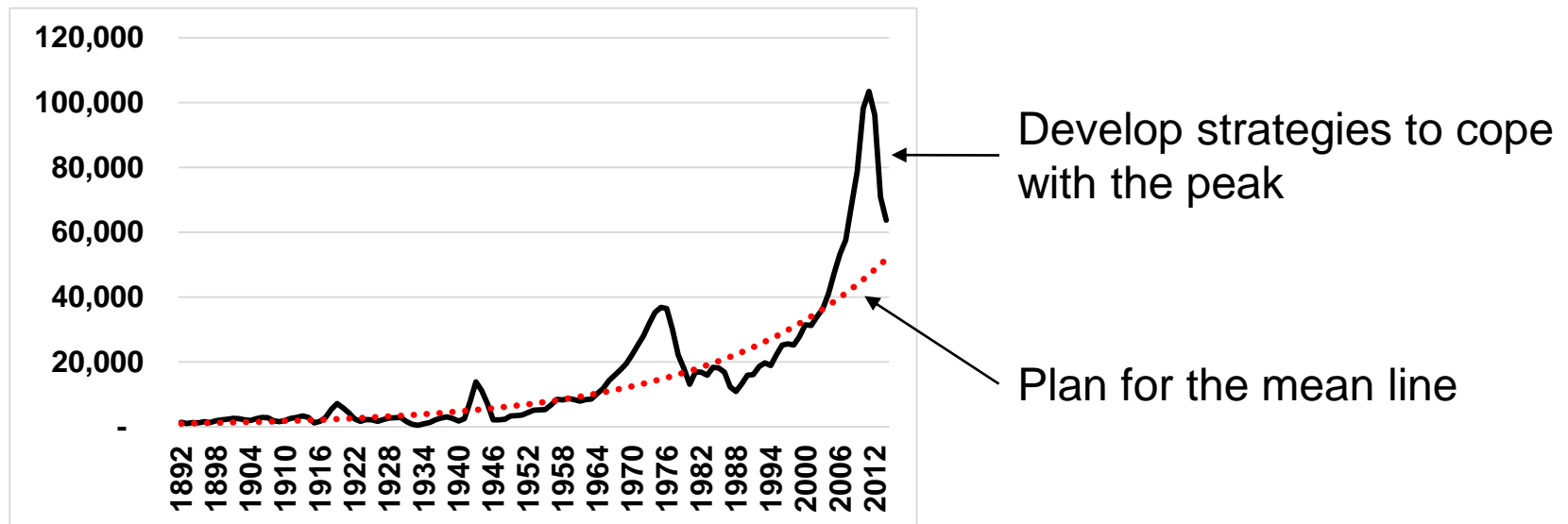
Economic compromise

In doing this the shipyard is likely to be less economically efficient at the peak – but peak price levels would more than compensate for the reduced performance.



Flexibility of capacity

This approach would require that a shipbuilding strategy is identified that would permit **flexibility** of **fixed capital** and **human capital**.



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We saw some good examples of methods to achieve this in Korean yards at the recent peak, with shipyards using **floating drydocks** for temporary fixed capital enhancement and **subcontracting of steelwork** to external companies to overcome human capital limitations.

Time for a new shipbuilding business model?

The prevailing paradigms that define what a shipyard is are now around 70 years old.

Is it now time to re-evaluate how shipbuilding works?

Developments tend to concentrate on improving steelwork but shipbuilding is above all an assembly industry and focus needs to be on optimising the assembly process and the supply chain.

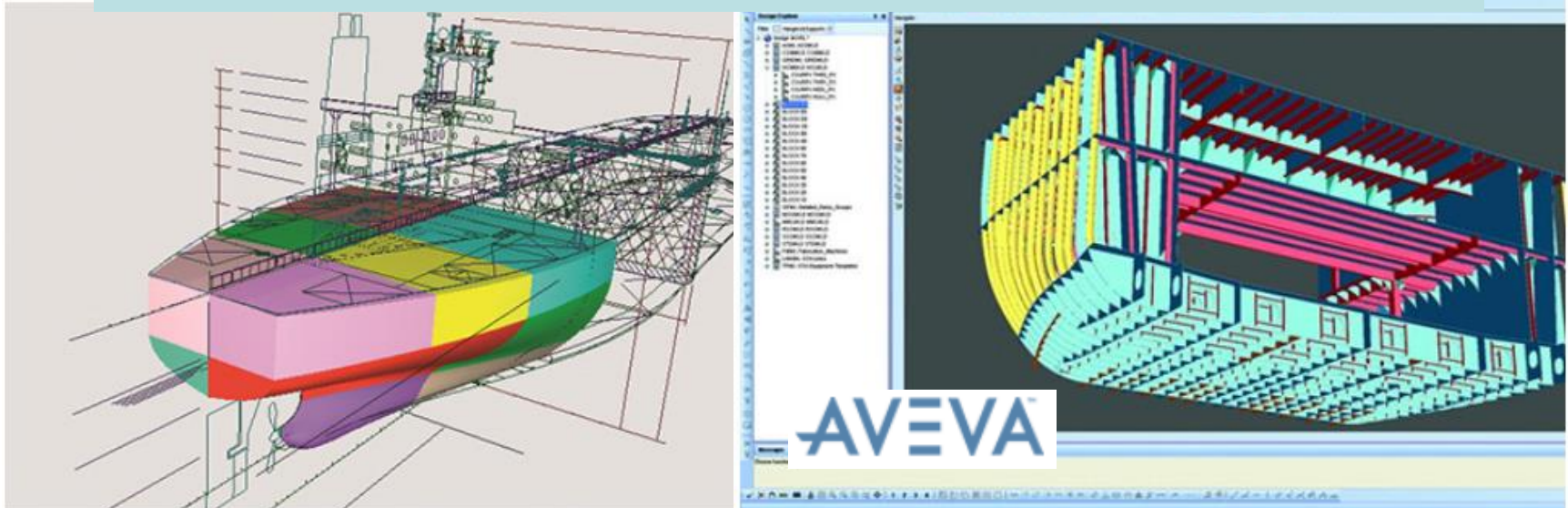
This is **not just about the physical production** – we need to think about moving all aspects of the business forwards.

Focus on assembly

For example:

Modern design systems model the ship in virtual space to a high level of detail and to a great degree of accuracy.

This would enable assembly planning to be simulated and optimised prior to production commencing – with a consequent reduction in cost – **providing that time is available to achieve that.**



Focus on assembly

But...

The prevailing standard shipbuilding contracts link payment terms to physical progress, and thus work against the attainment of benefits from the virtual ship model – **they force physical production to start as early as possible.**

We need a standard contract for the **21st Century** to capture the value from the modern design system.

Shipbuilding 4.0

Shipbuilding needs to take a fresh view of how the industry works to move into the 21st Century.

Moving forwards is no longer a matter of improved 'metal bashing' nor has economy of scale worked.

We need a new concept of what a shipyard does and how it does it to move the industry forwards.

Above all, shipbuilding needs to **invest more in research**, strategic thinking and planning for the future.