

Statistics-based analysis of project data for improved understanding of the effect of production strategies and methods on performance

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Production strategies and methods



Production strategies and methods



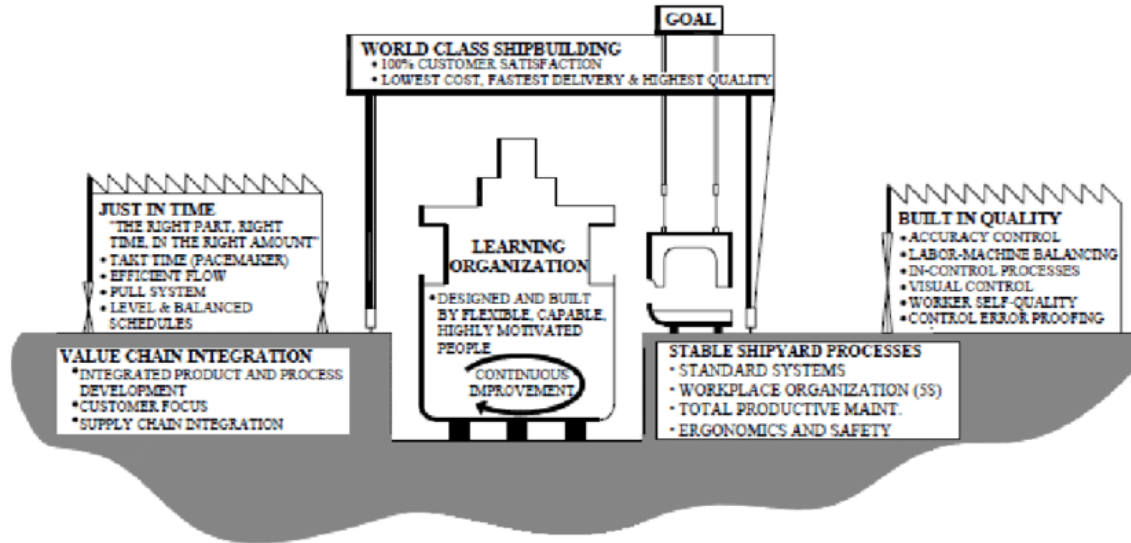
Production strategies and methods



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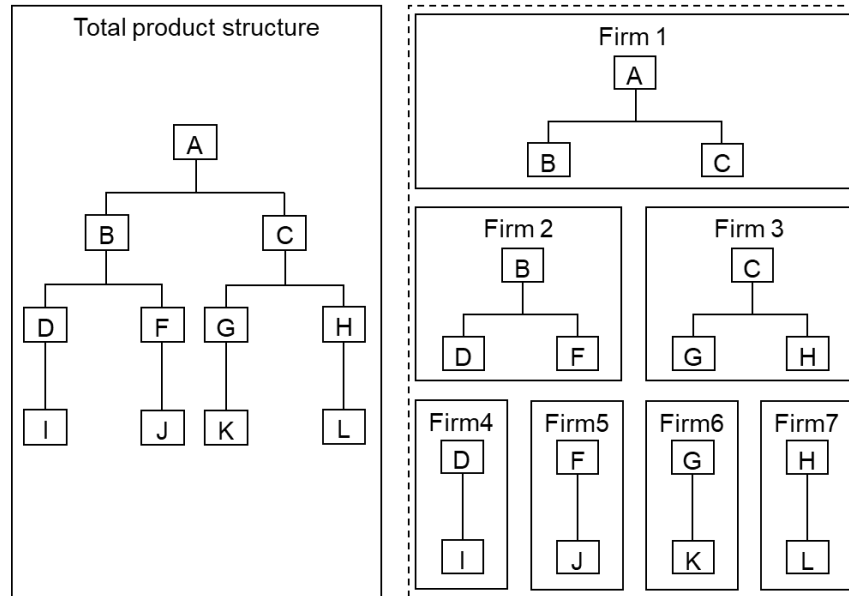


Production strategies and methods



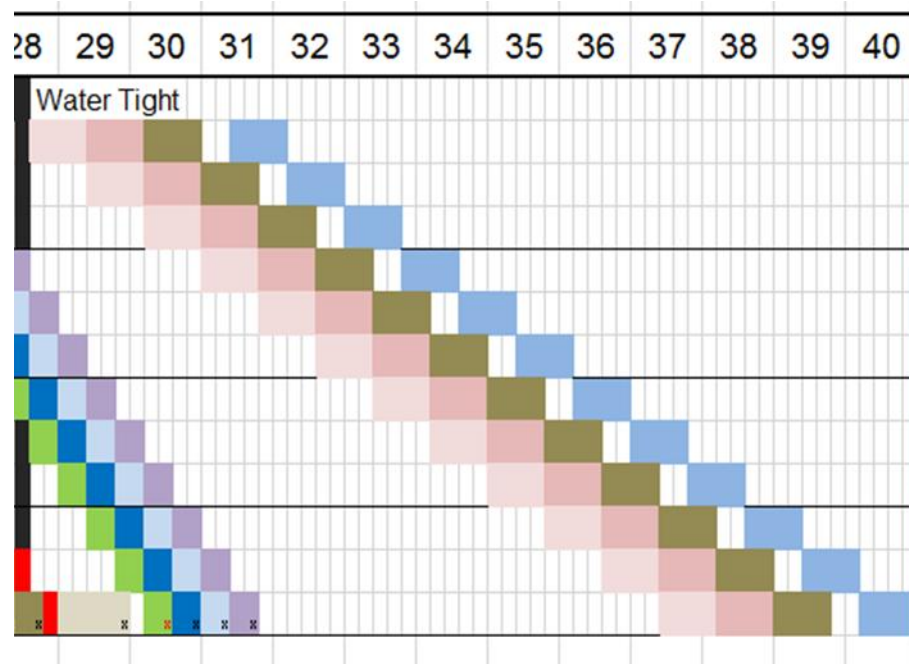
(Liker and Lamb, 2000)

Production strategies and methods



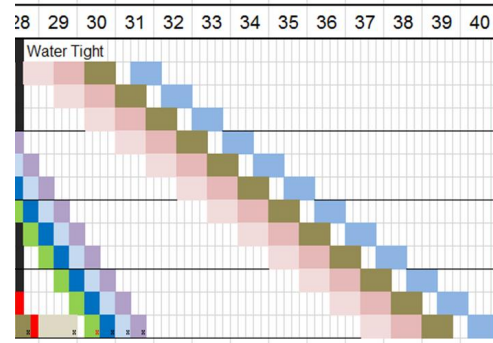
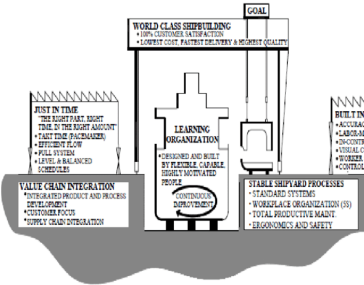
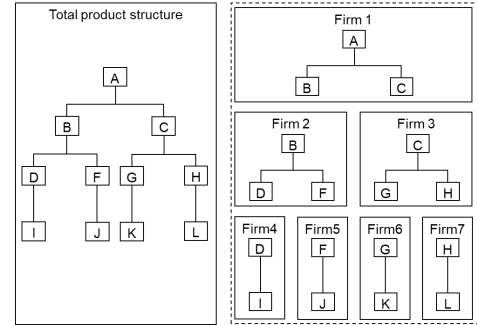
(picture Jan Olhager)

Production strategies and methods



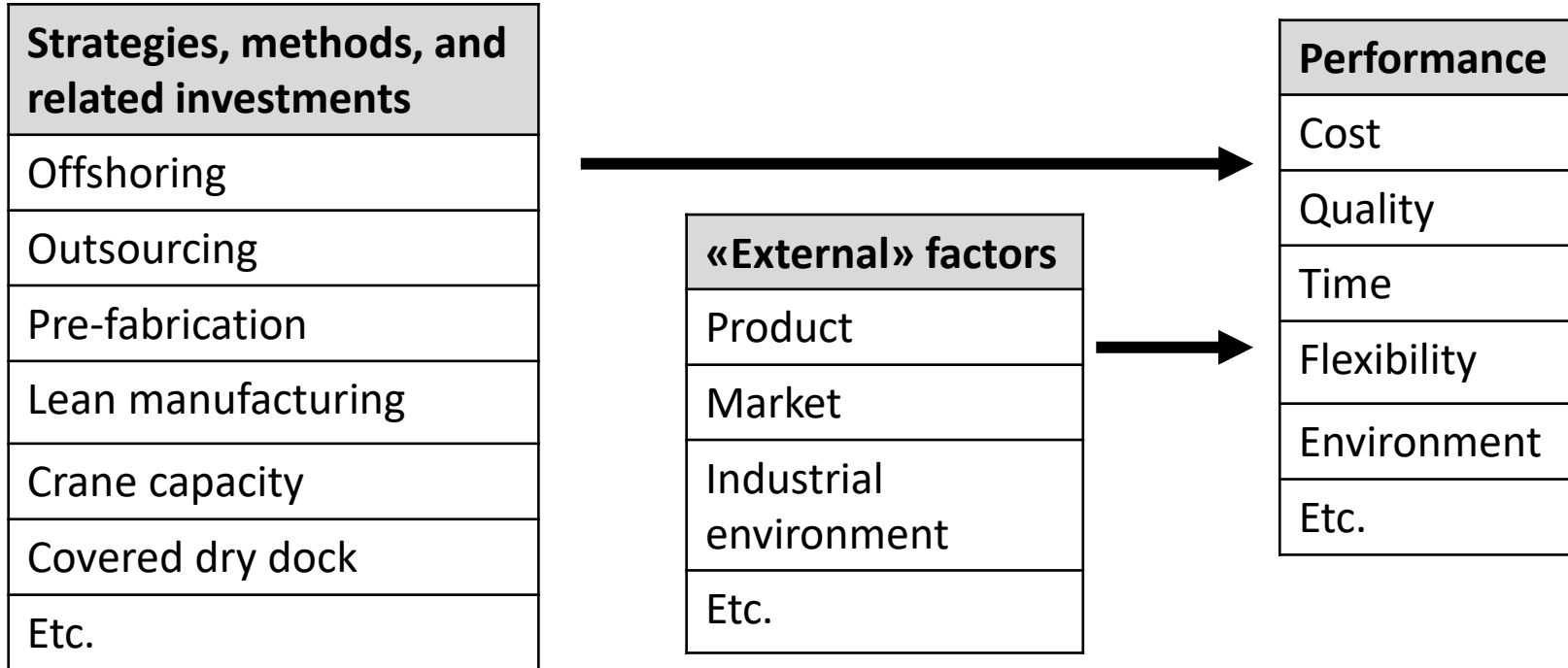
(Picture Iris Tommelein)

Production strategies and methods



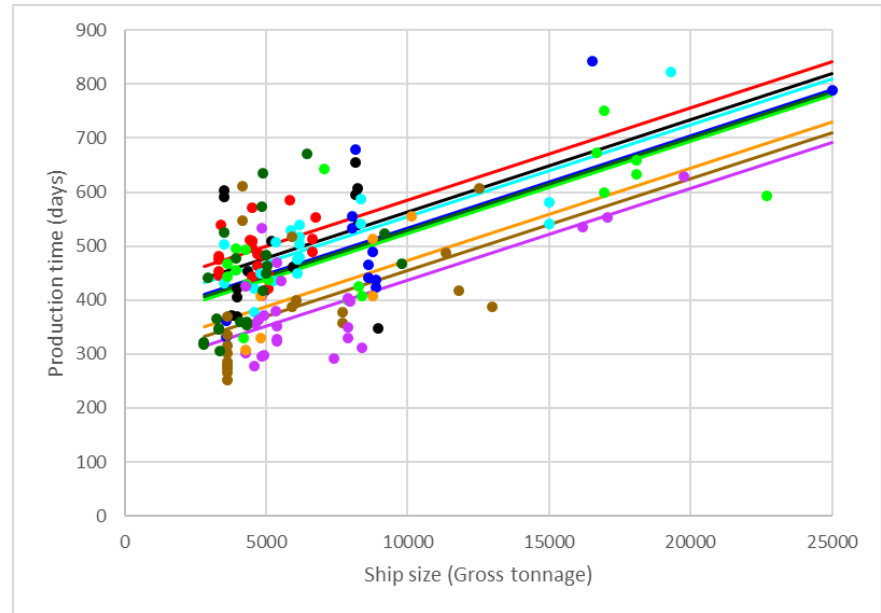
Effect on performance

Independent variables → Dependent variables

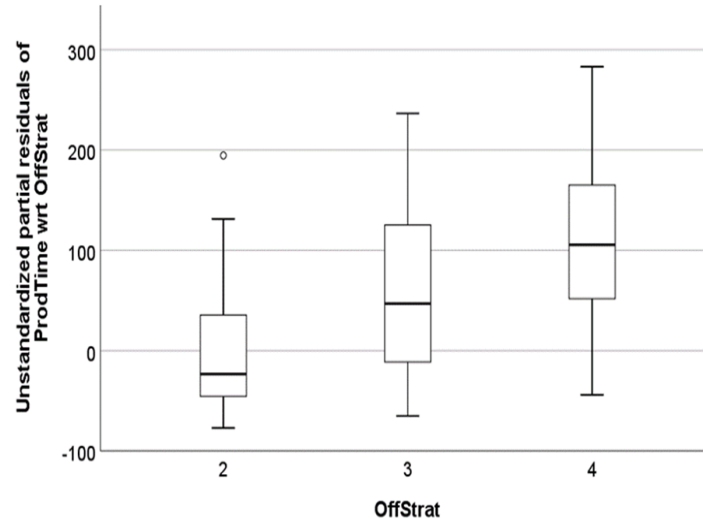


Multiple regression analysis

- Estimate the impact (effect size) of a specific factor when the effect of other (controllable and uncontrollable) factors is removed
- Assess how sure we can be that the effect is not “random” (i.e. caused by something unrelated to the factor of interest) (significance)



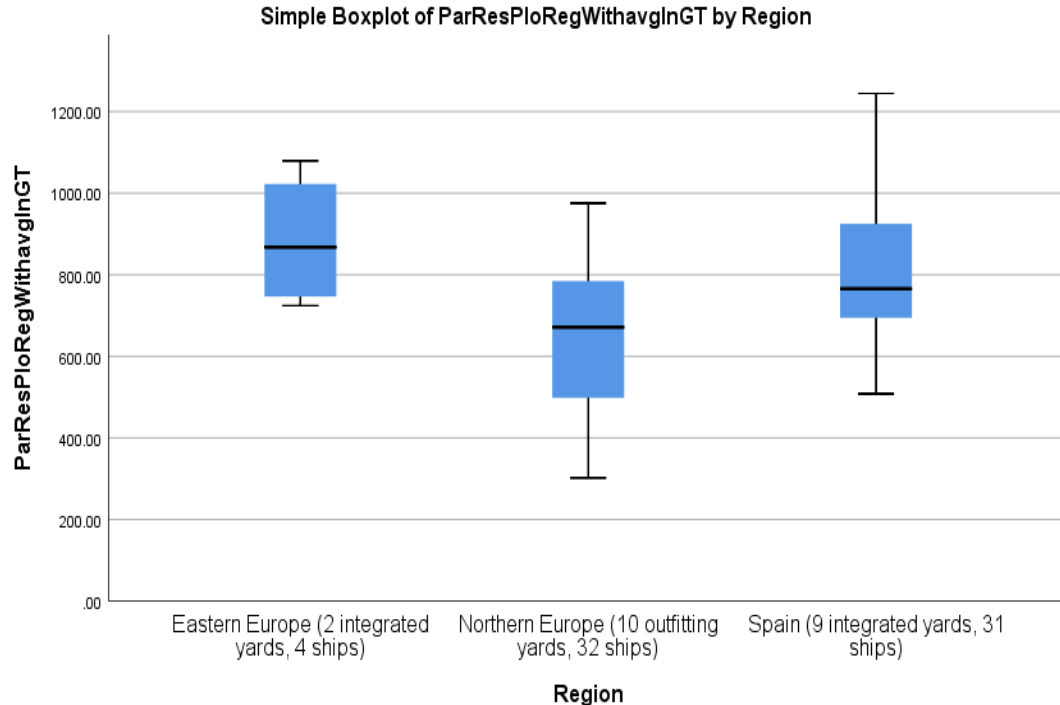
Example: Effect of offshoring strategy on production time



...while controlling for the effect of:

- Ship size
- Ship complexity
- Repeat production
- Market situation

Example: Comparing delivery time performance among regions



... while controlling for the effect of ship size on performance.

Note: This is a work-in-progress (preliminary results)

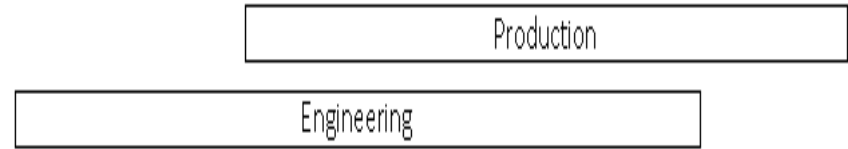
Example: Effect of shipbuilding methods

Pre-outfitting



50 days shorter production time for each 20% more pre-outfitting, with respect to the total outfitting work

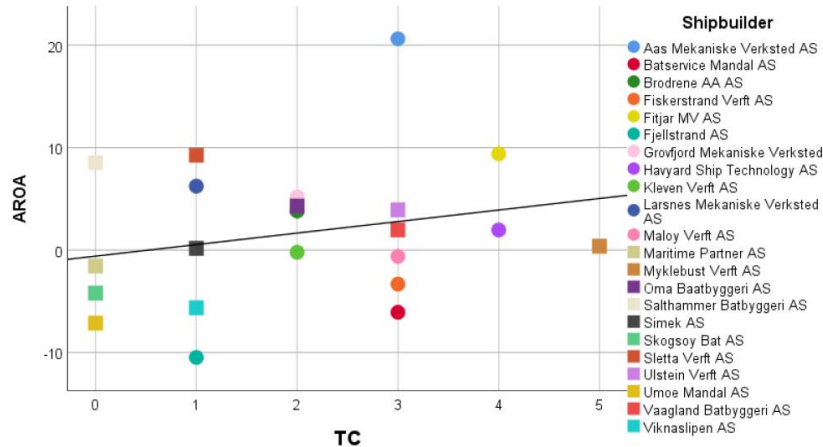
Overlap engineering-production



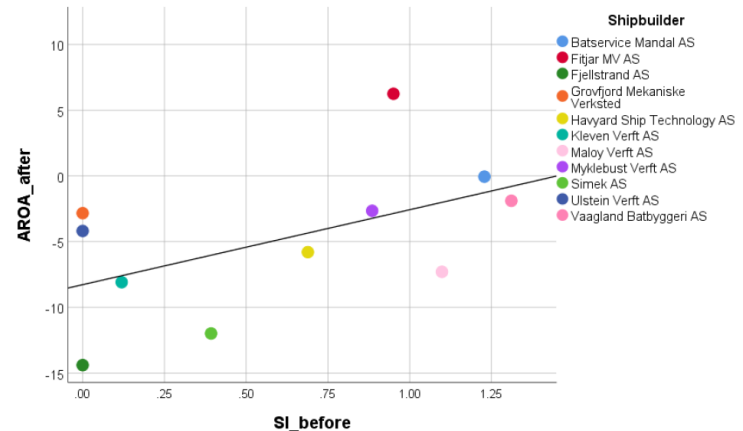
Neither production nor delivery time significantly affected by the degree of overlap between engineering and production.

Example: Effect of diversification

Norwegian yards producing few ship types were not more profitable than yards producing many ship types.



Norwegian yards with wider portfolios before 2014 were more resilient after 2014 than those focusing on offshore vessels before 2014.



Conclusions

- New insights into the effect of strategies and methods on performance (the “what”)
 - Basis for more informed decision-making
- Experience in using a fact-based approach to performance analyses in project-based manufacturing (the “how?”)
- Opportunities
 - Within-company analyses (good data access)
 - Cross-company benchmarking
 - National and international industry performance comparisons

References

- Jean, Q. An empirical assessment of the relationship between ship type variety and the financial performance of shipbuilding firms. Master thesis NTNU, 2020, Trondheim.
- Semini M, Brett PO, Strandhagen JO and Vatn J. Comparing Offshore Support Vessel Production Times between Different Offshoring Strategies Practiced at Norwegian Shipyards. Journal of Ship Production and Design 2022: 1-13.
- Semini M, Patek C, Brett PO, Garcia Agis JJ, Strandhagen JO and Vatn J. Relationships between build strategy and time in European shipbuilding. Submitted to the Journal of Engineering for the Maritime Environment, 2022.