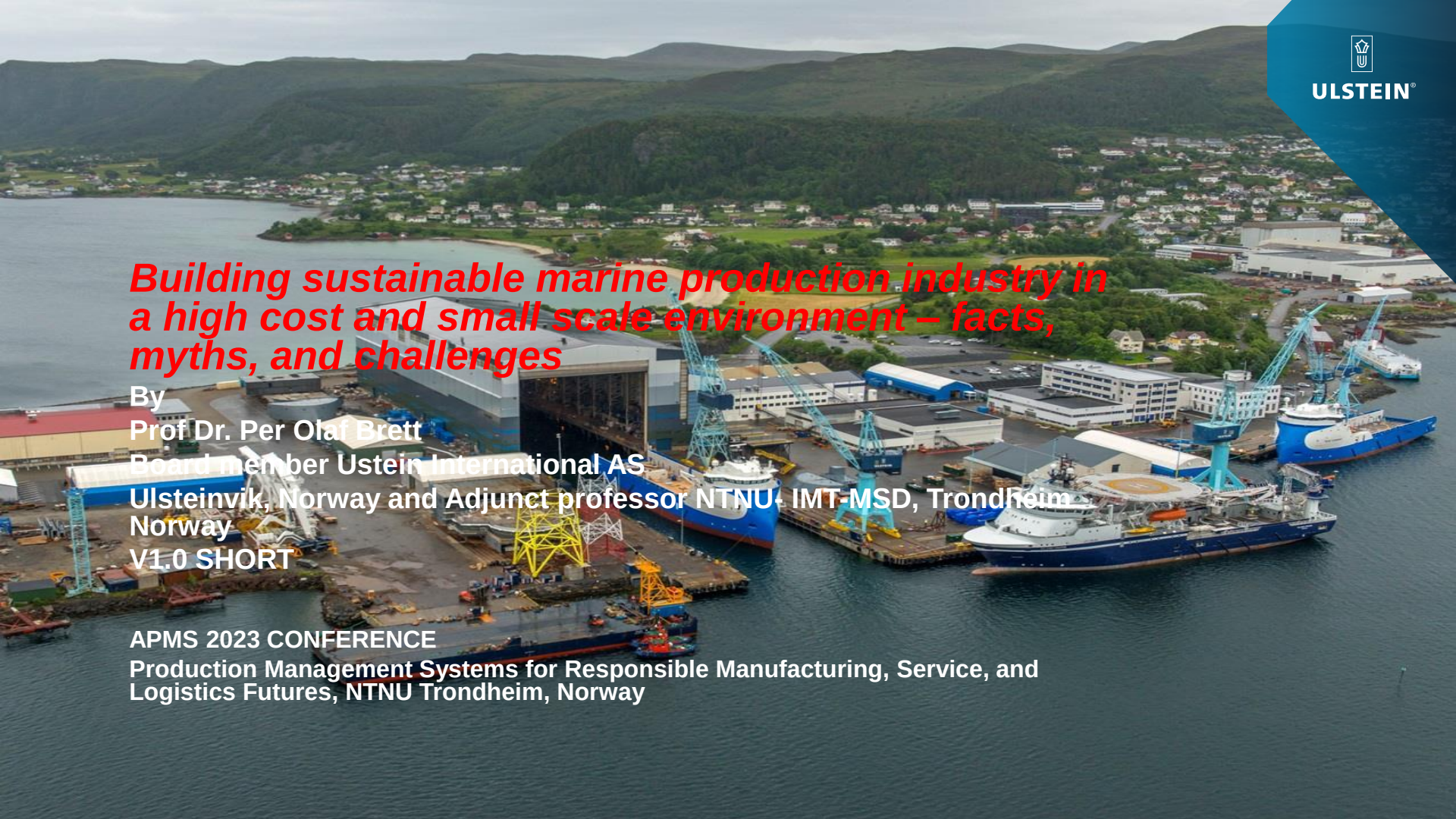


Building sustainable marine production industry in a high cost and small scale environment – facts, myths, and challenges

By

Prof Dr. Per Olaf Brett

Board member Ustein International AS

Ulsteinvik, Norway and Adjunct professor NTNU- IMT-MSD, Trondheim Norway

V1.0 SHORT

APMS 2023 CONFERENCE

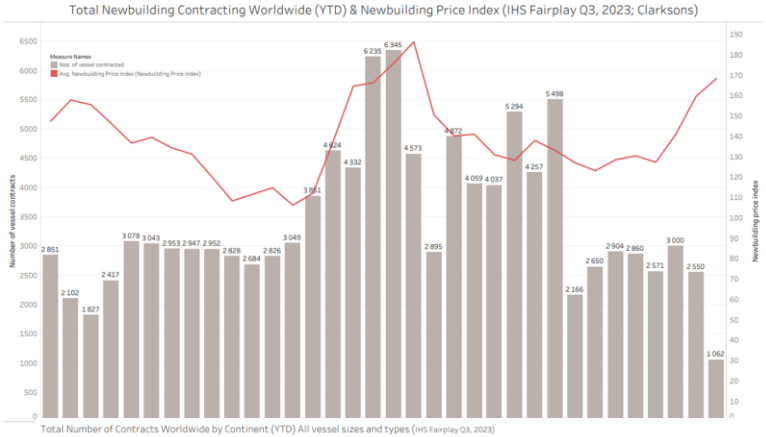
Production Management Systems for Responsible Manufacturing, Service, and Logistics Futures, NTNU Trondheim, Norway

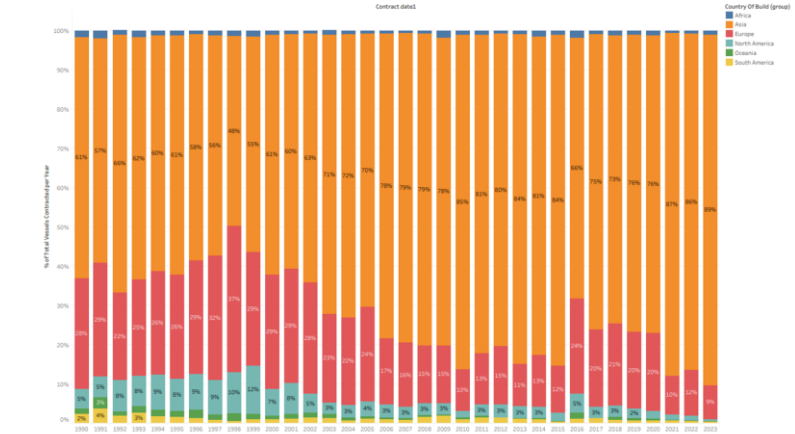
WHAT ARE WE UP AGAINST?

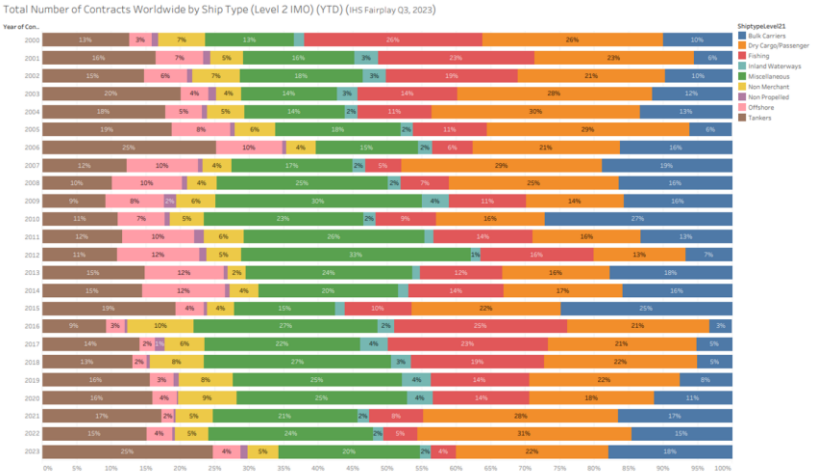
- The marine production industry is a worldwide appearing activity and will exist as long as there is international trade
- It consists of larger fully integrated, complex organizations and smaller, simplistic, and specialised project management-oriented outfits
- The marine production industry is very diverse – in terms of their type of operation, facilities, location, expertise and business value creation concepts including the product and service portfolio
- Most of maritime industry outfits in Norway are typically high-cost, small to medium scale operations and one-offs or small series production-oriented manufacturers
- Most of the topical R&D and state-of-the-art subject literature address and explain how large production operation systems work
- Manufacturing or production expertise and competence development are typically centred around big scale operations and mass-production to little extent, small EtO operations
- The marine industry worldwide is continually subject to extreme market dynamics and competitiveness scrutiny
- Even in little Norway, we have at least three tiers of shipyards, three tiers of ship equipment suppliers and three tiers of ship design firms, which all of them have their own business concepts and strategy, performance yield history, market position, product and service portfolio, and location

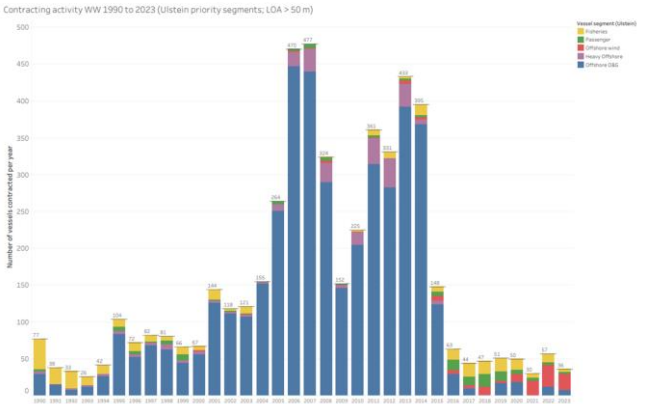
Diversity…

THE MARKETPLACE - WHAT IS HAPPENING OUT THERE? – WHAT IS BEING BUILT? - WHERE ARE THEY BUILT? – CONSEQUENCES?

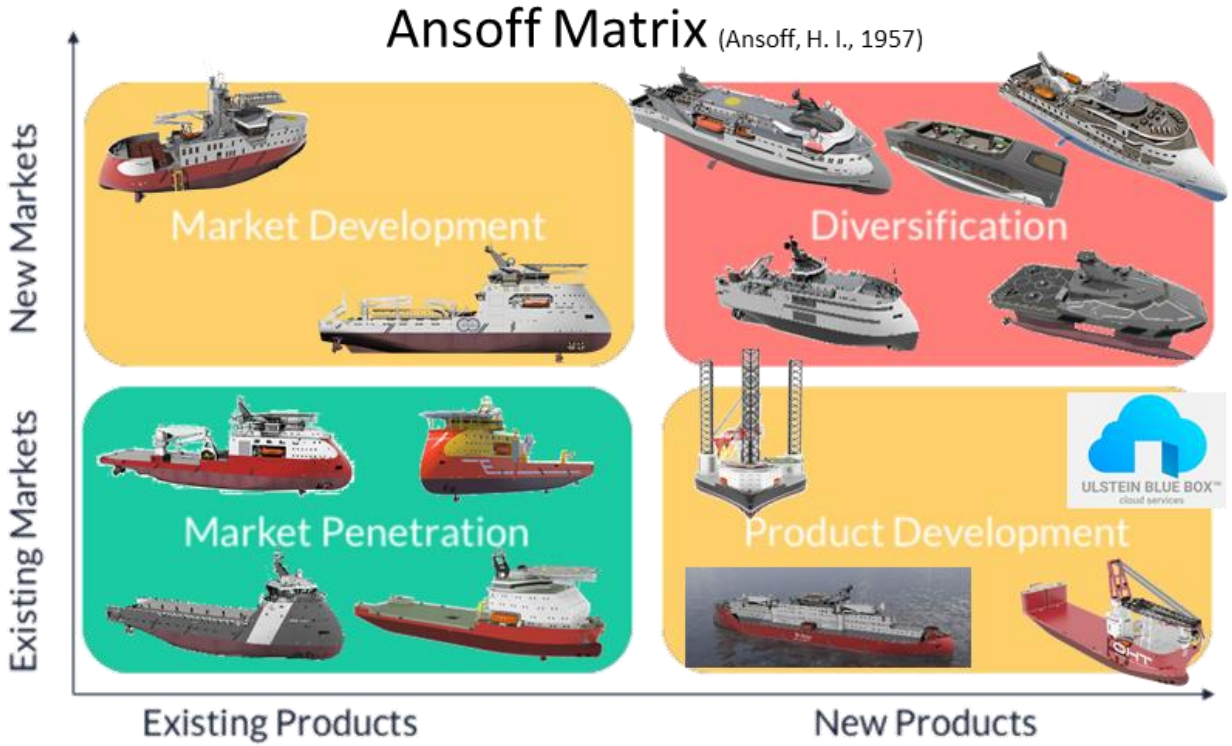








STRATEGIC PRODUCT & SERVICE DIVERSIFICATION – AN EXAMPLE



Consequences and implications:

- New customers
- New markets
- New operations
- New technology
- New expertise and skills
- New facilities, tools and equipment…

CHARACTERISTICS OF BUSINESS CONCEPTS – THE BASIS FOR PRODUCTION MANAGEMENT SYSTEMS DEVELOPMENT

Project based production

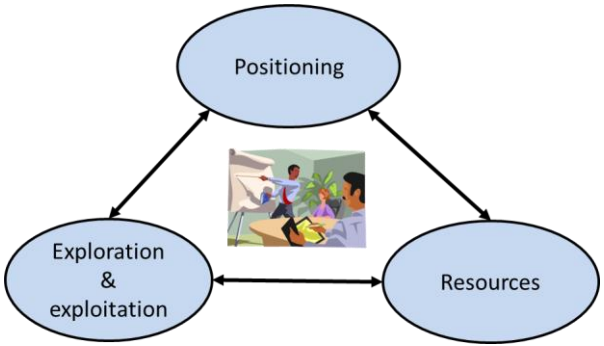
Yards with external suppliers

Fully integrated yard concept

Position in the value chain…

Project based operations

- Small volumes
- Relatively little staff
- Very high skills
- Discontinued production
- High flexibility
- Little equipment
- High mobility
- Outsourcing and hire
- National or regional operation

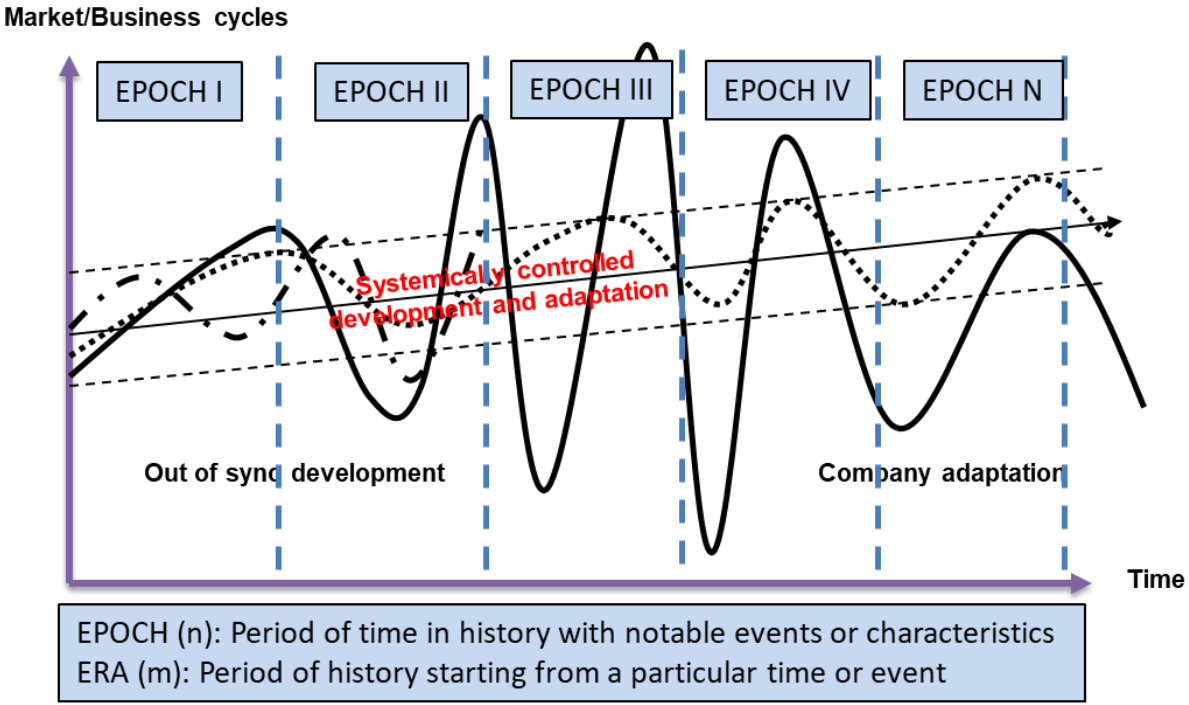


Source: Fjeldstad & Lunnan 2014

Fully integrated operations

- Big volumes
- Big staff
- Low level skills
- Continuous production
- Low flexibility
- A lot of equipment
- Extremely rigid
- Inhouse sourcing
- International or global presence

HOW TO DEAL WITH EXTREME MARKET DYNAMICS AND COMMERCIAL, OPERATIONAL, AND TECHNOLOGICAL FLUCTUATIONS?

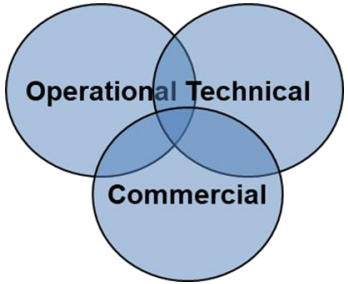


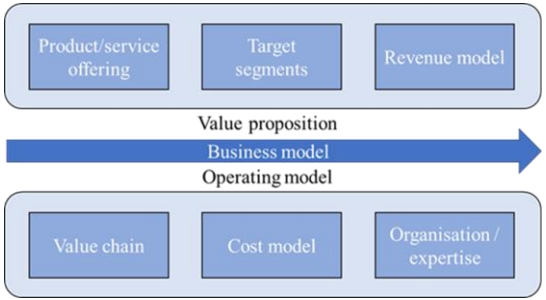
- The end of competitive advantage…
- The risk of being trapped in an uncompetitive business
- The continual configuration: Achieving balance between stability and agility

Source: McGrath 2013

PREMISSES FOR FUTURE RESEARCH AND DEVELOPMENT OF PRODUCTION MANAGEMENT SYSTEMS FOR THE MARINE INDUSTRY…

- Research and innovation must adapt and apply a much broader and multidisciplinary perspective and approach than in the past, when undertaken…
- Production management systems development must capture and include mitigating solutions for all issues related to commercial, operational, and technical matters
- Production management systems development must be able to deal with dynamics in a holistic way grounded in mainstream systems theory



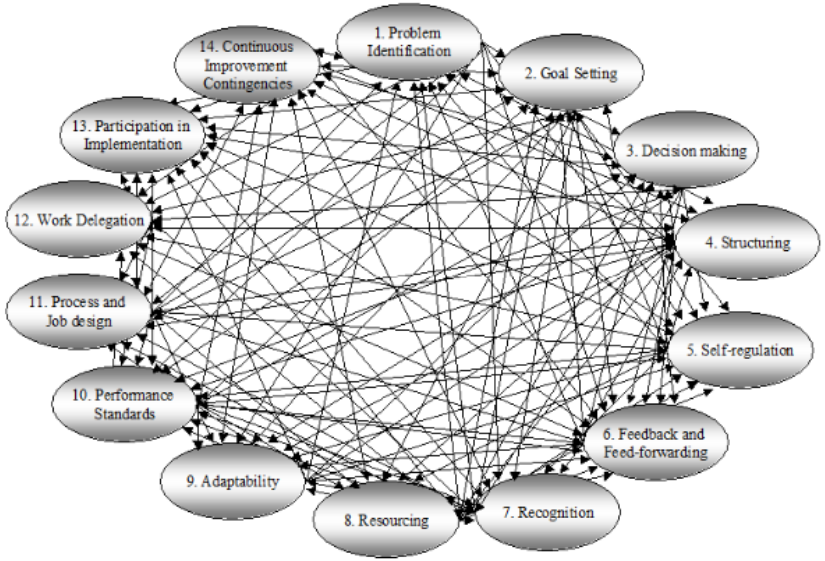


WHAT IS SYSTEMS MANAGEMENT AND THE MANAGEMENT SYSTEMS APPROACH?

Over the years many definitions and explanations have been offered by systems theorists of management systems:

1. A documentation of what is going on in the company
2. A collection of policies, procedures and instructions
3. The rules of the game of the firm
4. A group of interacting bodies under the influence of related forces
5. An organized set of doctrines, ideas, or principles usually intended to explain the arrangement of working the systemic whole

Source: Brett 2000; Batten 1991



Volume $1_{v1.1}$ of 2

"The Management Systems Approach: Content Characteristics of an Emerging Model for Managing Organizations toward Performance Excellence"

A thesis submitted to Brunel University, Henley Management College, U.K., in partial fulfillment of the requirements for the degree of Doctor of Business Administration.

By
Per Olaf Brett

A consolidated 'causal map' of theoretically identified interrelationships among content characteristics of the "OPEN" management systems approach.

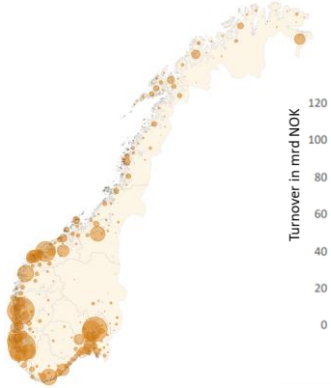
THE DILEMMA IN PRODUCTION SYSTEM DEVELOPMENT

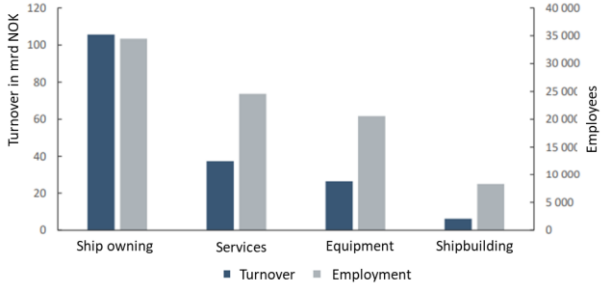
How much:

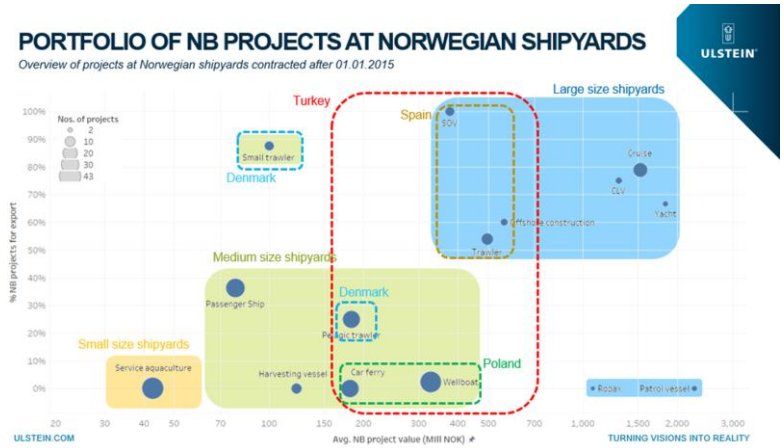
1. Improvements versus investments?
2. Automation versus labour intensive work?
3. Production versus projects?
4. Inhouse resources versus outsourcing?
5. Production versus innovation?
6. Small-scale (EtO) versus mass-production (StO)?
7. Operational systems flexibility versus stable and traditional production concept and facilities?
8. National versus international presence?

WHY IS MARINE PRODUCTION MANAGEMENT SYSTEMS IN NORWAY IMPORTANT?

- It consists of ship owning, services, equipment manufacturing, and shipbuilding
- it goes on everywhere in Norway
- it employs approx. 90 000 people
- The yearly turnover is approx. 500 bill NOK
- The turnover in marine manufacturing related activity is approx. 100 bill. NOK, 30 000 people employed, value creation 30 bill. NOK
- But a result +/- 0 – *The challange!*







SUMMARY OF KEYNOTE SPEECH

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Facts:

- Extreme dynamics create uncertainty
- Diversity leads to complexity
- Transient competitive advantage requires options, mobility, and flexibility
- Industry segment building takes time – very long time
- Continual influx of new knowledge and expertise is necessary

Myths:

- Learn from the big ones
- Established production management systems knowledge and concepts can be applied
- Stability and consolidations work
- It is arbitrarily what industry (segment) to build – phase out and in because they all contribute to the value creation of the country – yes, they do, but by different scales…

Challenges:

- New production systems development - theory, methods, concepts, and tools must be developed and implemented especially “fit” for bespoke operations
- Flexibility and adaptability is crucial in new production systems development efforts
- New production systems development must be able to handle transient competitive advantage needs
- Industrial diversity must be better catered for…

A «TASTE» FOR THE RESEARCHERS

Proposition 1:

… is it possible to study and assist the Norwegian marine manufacturing industry by «mainstream», «state-of-the-art» knowledge and expertise grounded in international production management systems research and innovation?

Proposition 2:

… much of the relevance and applicability of much of the existing production management system knowledge repository is not really there?

Proposition 3:

… current production management systems research is not capturing and encompassing the systemic requirements to a robust systemic approach?

Proposition 4:

… whatever the production management system is meant to improve a common factorial model should be used to ensure the holistic approach to problem-solving?

Proposition 5:

… according to the Institutionalists – mimetic ISO-morphism doesn't work? What works then?

KEY-NOTE TAKE-AWAYS FOR ALL…

1. When we talk production improvements and related research and innovation be aware of the type of industry we are addressing – «one size does not fit all»
1. Category, market, size, product & service portfolio, business proposition, value creation concept, and presence matters – production improvement efforts not grounded in commercial, operational and technical contemplation of past, present, and future challenges doesn't work – get out of the silos…
2. Different industries and market segments represent different challenges and solution spaces, when it comes to production enhancements – recognize and deal with the uncertainties and dynamics of more niche-oriented segments
3. Different and «bespoke» theories, methods and tools are needed to better suit the diversity of industry segments and their special situation – mainstream and niche-oriented manufacturing research and innovation must go on in parallel, but in an orchestrated way to achieve full synergy effects of future knowledge and competence building

My dream…

1. Norwegian marine industry, therefore, must be quickly and sufficiently equipped with a "menu-card" of knowledge-based recipes for production management system development success
2. More focus, man-resources and funding must be allocated this vital, but rather traditional industry segment in Norway and worldwide…

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