Choice Navigation: Towards a Methodology for Performance Assessment

Simon Haahr Storbjerg, Vestas Wind Systems – Configuration & Cost Management
Kjeld Nielsen, Aalborg University – Department of Mechanical and Manufacturing Engineering
Thomas Ditlev Brune, Aalborg University – Department of Mechanical and Manufacturing Engineering
The Danish Agency for Science Technology and Innovation

Research project: Agility in New Product Introduction

Simon Haahr Storbjerg
M.Sc., Industrial PhD Student
Configuration & Cost Management
Vestas Wind Systems A/S

Industrial Research Project
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Three-part collaboration

Research project: Agility in New Product Introduction

The Danish Agency for Science Technology and Innovation
**Purpose & Agenda of Presentation**

1. **Purpose**
   - Receive feedback on: relevance, approach and expected results

2. **Purpose & Agenda**
   - Present results reported in paper
   - Invite for further discussion and collaboration

3. **Agenda**
   - 1) Introduction
   - 2) Motivation for the Research Project
   - 3) Design of Research Project
   - 4) Framework for Performance Assessment
   - 5) Ongoing & Future Work
Introduction

Vestas Wind Systems Product Portfolio
Introduction

Vestas Wind Systems Product Portfolio

- Swept Area: 21124 m²
- Mega Watt: 7.0
- Blade Length: 80 m
- Approx. Hub Height: 105 m
- Rotor Diameter: 164 m
- Approx. Tip Height: 187 m
- Weight (ex. Tower): ≈500 tonnes

Airbus A380 Length: 72.7 m
the world's largest passenger airplane

Wind. It means the world to us.
WTG: Intro to Systems and Modules

Module 1

Module 2

Module 3

Module 4

Module 5

System A
e.g. Electrical sys

System B
e.g. Hydraulic sys

Wind. It means the world to us.
Intro to Systems and Modules – contd.

Wind. It means the world to us.
Motivation for the Research Project

Unsustainable setup that creates an variant in Engineering every time we create a sales variant

**Turbines**
(the individual variants we administrate)

- Complete set of Mk 1 doc
  - CAD
  - RS
  - DFMEA
  - etc.
  - MSI xxx
  - MSI xxx

- Complete set of Mk 2 doc.
  - CAD
  - RS
  - DFMEA
  - etc.
  - MSI xxx
  - MSI zzz
  - MSI yyy

- Complete set of Mk 3 doc.
  - CAD
  - RS
  - DFMEA
  - etc.
  - MSI xxx
  - MSI zzz
  - MSI yyy

**Production**
(the variants they produce)

- The 100% Engineering BoM is converted into a 100% Production BoM

**SBU**
(the variants they sell)

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Turbines
---

- MSI xxx
- MSI zzz
- MSI BoM

Production
---

- MSI BoM
- MSI BoM
- MSI BoM

SBU
---

- MSI BoM
- MSI BoM
- MSI BoM

---

**Motivation for the Research Project**

Unsustainable setup that creates an variant in Engineering every time we create a sales variant

Wind. It means the world to us.

Sales Configuration
Motivation for the Research Project

Inefficient approach at variance creation

New demand from the market

Mk 1 baseline

Copy of Mk 1 baseline as basis for Mk 2

Design changes carried out on baseline and documented

Complete set of Mk 1 doc - CAD - RS - DFMEA - etc.

New demand from the market

Mk 2 baseline

Copy of Mk 2 baseline as basis for Mk 3

Design changes carried out on baseline and documented

Complete set of Mk 2 doc - CAD - RS - DFMEA - etc.

Complete set of Mk 3 doc - CAD - RS - DFMEA - etc.

“Changing market demands we respond to by copy/pasting existing products and redesigning them into new stand alone products.”

“Hereafter we manually create a documentation package for the each new product variant whilst the old one remains active.”

“Over time we end up creating many different stand alone product and a massive administrative burden and no real coherence across the set of products that should have been a true family.”
Motivation for the Research Project

Insufficient IT-infrastructure
Motivation for the Research Project

Symptoms: Poor performance on engineering change handling

Benchmark: 135 enterprises in aerospace and defense, automotive, high-tech, industrial products, and other manufacturing industries.

Top performers hit targets,
Source: Aberdeen Group, May 2007

Vestas Current Status:
All open changes, OTIF 14%
Motivation for the Research Project

A maturing wind industry

Overview market shares, 2005-2010 [% delivered MW]

Roland Berger, 2010

Expected overcapacity evolution (%; 2009 – 2013)

Roland Berger, 2010
Design of Research Project

Key Design Variables

- Company in a maturing industry
- Mixed order delivery strategy: ETO, MTO, ATO
- Inefficient approach for creating product variance
- Insufficient IT-infrastructure
- Lack of competencies, culture & routines
- Radical Change
- Socio-technical problem
- Challenge at strategical, tactical & operational level
Design of Research Project

Target & Approach

Guide & support EPC companies in the process of building capabilities needed for efficient introduction of new product variants

Strategic Direction

Maturity of the organizational Capabilities(*)

Feedback & follow up

Current State

Future State

(*) Ability to introduce new profitable product variants
Capabilities for Efficient introduction of new product variants

The three fundamental Mass Customization capabilities

- Solution
- Space
- Development

- Choice
- Navigation

- Robust
- Process
- Design
How can performance assessment support the implementation of the choice navigation capabilities? What performance assessment methodologies are appropriate?

Purpose: clarify performance assessment methodologies, that can give valuable feedback on the implementation of the choice navigation capabilities, so that corrective actions can be taken.
Framework for Performance Assessment

How to model the process of building capabilities as a system?

(Boer et al. 2001)
Framework for Performance Assessment

What dimensions of performance can be identified?

Three potential dimensions for performance assessment
1) The degree to which the capabilities have been built
2) The choice navigation process performance
3) The output performance of the choice navigation process
Framework for Performance Assessment

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Ongoing & Future Work

Design Requirements for method/tool to strategic planning & follow up

Maturity of the organizational Capabilities(*)

Performance measures supporting the transition towards MC

Current State

Strategic Direction

Mass Customization

Engineering Change Management

Product Configuration Future State

ECM Capability Framework

Framework for performance assessment

(*) Ability to introduce new profitable product variants
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