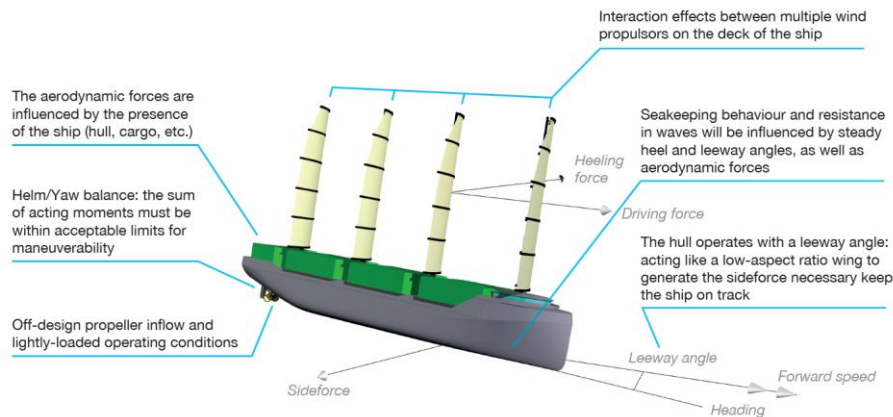


Shipping: an innovation system in the making

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Marktnischen

South-South Handel – neue, wachsende Märkte?

Fairtrade



Nachhaltige Konsum

Coffee, Kenco Coffee (Kraft UK), Mars Inc (cocoa)

Greenbiz (2011)

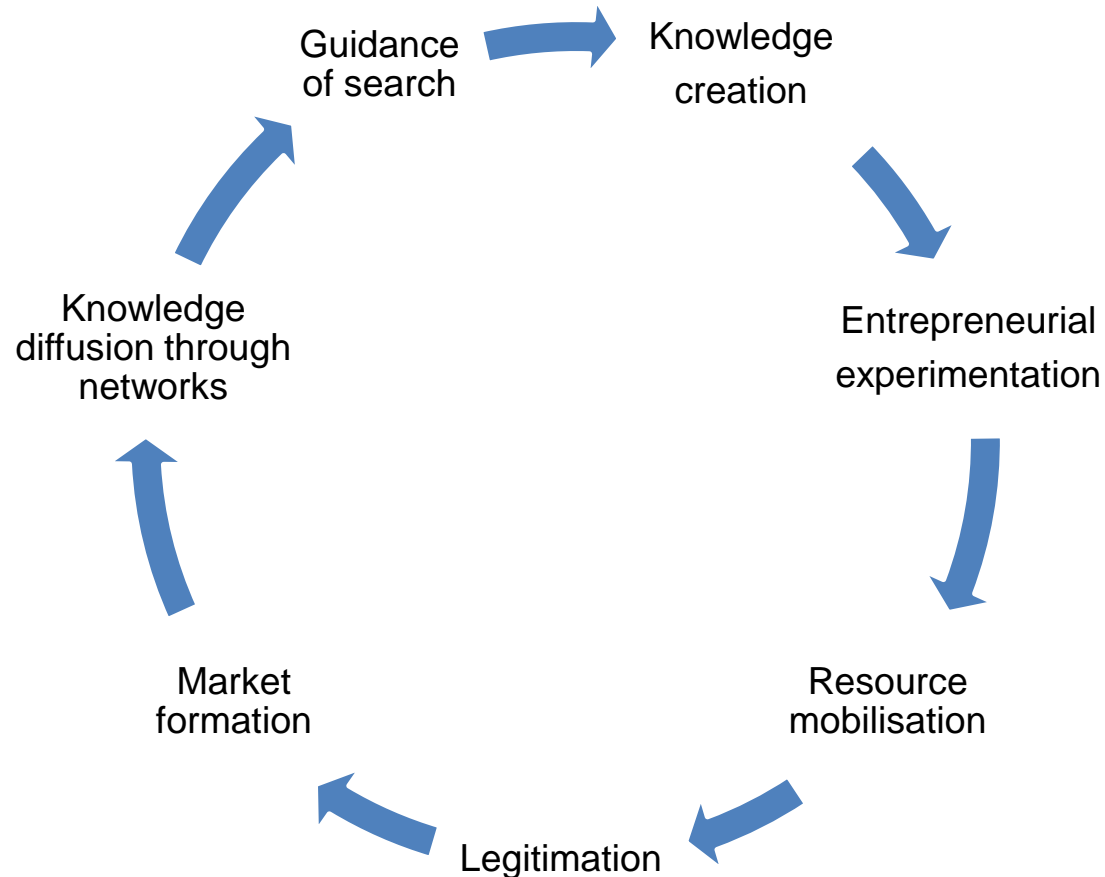


Technologienischen

- Biotreibstoffe: tatsächlich nachhaltig?
- Langsam Fahren
- Wind für die Seeschifffahrt



Conditions for market-uptake in a TIS



Market-uptake occurs when cumulative causation between 7 functions works

Landscape

North Sea LNG reserves

EU Baltic, US, Canada NOx SOx regulations

Norway NOx SOx regulations

Niche 1 LNG carriers

Gas carriers
LNG steam turbines
LNG low speed diesels

LNG supply for industry

Niche 2 ECAs Ferries, short sea Nor, Baltic, USA, Canada

Ferries: Nor, Baltic
LNG med speed diesels
Dual fuel, diesel-electric

Market Demand
Nor, Baltic ferries

Norway Local Ro-Ro,
Baltic, Canada, US

Environmental, Design Regulation

Market Demand Shippers, Logistics firms

Shipyards Engine Suppliers Designers

Operators Ports, fuel supply

LNG Ships 2016



- 77 Ships in operation (excluding LNG carriers)
- 44 ships with LNG-Antrieb on order in 2016
- + 35 Ships with provision for LNG ordered

LNG Niche

Landscape: Macro-economics

LNG availability

Environmental Regulation

EU, national Environmental policy
F3

NGOS, lobbies
F7

Investment Incentives
F4

Trade and development Policy

Economic Growth

R&D

Class (Lloyds DNV-GL)
F2, F3

RINA SNAME
F3

Universities Research Institutes
F2, F3

Shipyards

Engine Suppliers

Designers
F1, F2, F6

R&D Policy, Subsidies,
F2, F3, F7

F4

Shipping companies, Charterers

Ports LNG supply infrastructure

Environmental constraints
F4

Finance, Lloyds

F4, F5

Price, delivery Time
F5

F4, F5

Freight rates
F5

Demand

Demand for sustainability industry consumers

Shippers, Logistics firms
F4, F5

F3

F4

F4

F4

F4

F4

F4, F5

F4, F5

Innovation System: wind

Landscape: Macro-economics

- F1 know gen
- F2 know diff
- F3 Guide Search
- F4 Entrep Expt
- F5A Mkt Dem
- F5B Mkt Supp
- F6 legitimation
- F7 Resource mob

