

Institution: Plymouth University
Unit of Assessment: 19 Business and Management
Title of case study: Sustainable environmental management in smaller ports.
<p>1. Summary of the impact (indicative maximum 100 words)</p> <p>Environmental regulations threaten commercial operations in many smaller ports. This impact case study empowered Falmouth Harbour Commissioners (FHC) to ensure sustainable anchoring, bunkering and ballast water exchange operations in Falmouth Bay by redefining environmental management as a business process and transforming stakeholder management. KTP award (KTP007098) funded by ESRC, NERC and FHC developed a Port Sustainability Management System (PSMS) and stakeholder management framework to ensure systematic collation and analysis of fragmented data, which ensured sustainable operations and safeguarded commercial revenue streams, protecting the port. A CUC-ESF studentship award (ESF11200NCO5) is investigating processes which underpin implementation in Europe's largest port industry.</p>
<p>2. Underpinning research (indicative maximum 500 words)</p> <p>This research has been undertaken by Professor John Dinwoodie, Dr. Sarah Tuck and Dr. James Benhin of Plymouth University and within the umbrella of the Marine Institute. Professor John Dinwoodie specialises in maritime logistics and his research interests span systems in shipping and logistics, port management and sustainable environmental management, including Low Carbon Shipping. He has contributed to numerous journal articles on port management and the maritime logistics of the oil industry [1]. Sarah Tuck is a specialist in maritime business with interests in small ports and stakeholder engagement and undertook a PhD (Plymouth University, 2007) investigating social and economic aspects of the regional competitiveness of commercial ports and wharves in the South West of England, using a case study approach. James Benhin is a specialist in environmental economics who investigated the regional economic impacts of maritime operations.</p> <p>Research in marine sustainability has typically featured particular scientific processes, impacts or models and any available environmental sustainability initiatives to support port managers have focused on large ports that possess sufficient resources to employ specialist staff or engage external consultants. A paucity of research hampers smaller ports. Further, maritime operations as opposed to port or shipping operations, have rarely been investigated. Popular methodologies that aim to build quantitative models concerned with port efficiency or competitiveness [2,3,4] have limited relevance for smaller ports, and the development and deployment of qualitative methods, perhaps as case studies [5] to investigate management processes and stakeholder engagement in smaller ports has been a neglected field. Perhaps surprisingly, the business processes of managing maritime operations in ports sustainably had not been investigated previously. To redress some of these shortcomings our research initially deployed a case study strategy to investigate the processes of environmental management in a smaller port in depth. FHC oversee maritime operations in a very environmentally sensitive setting, within a business context which incorporates the UK's largest offshore marine bunkering operation [6]. Falmouth estuary is home to a living maerl bed of calcified, hardened seaweed. But much of the Estuary also contains dead maerl habitats where the impacts of routine maritime operations including anchoring and bunkering have rarely been reported. To date a business process approach has not been deployed to investigate inputs and outputs to the processes of sustainable environmental management in ports at strategic, tactical and operational levels and important issues concerning stakeholder management and communication have been overlooked.</p> <p>A Port Sustainability Management System emanated from our research, which now embeds environmental sustainability issues and management processes within a broader port management system. Professor John Dinwoodie has obtained further ESF-CUC research funding with Professor David Gibbs (Hull) to develop the PSMS further and investigate implementation issues throughout</p>

smaller ports in Devon and Cornwall. This ongoing work is intended to provide a platform to further refine the model and explore the process of dissemination both nationally and to other regions in Europe.

3. References to the research (indicative maximum of six references)

- [1] Dinwoodie, J., Bhatia, R., Daily oil losses in shipping crude oil. Measuring crude oil loss rates in daily North Sea shipping operations. 2004, *Energy Policy*. 32 (6), 811-822. ISSN 0301-4215. (ABS**; impact 3.193)
- [2] G.T. Yeo, M.Roe, J. Dinwoodie (2008) Evaluating the Competitiveness of Container Ports in Korea and China. 2008. *Transportation Research A*, 48(6), 910-921. ISSN 0965 8564. (ABS***; impact 2.705; ABDC2010 A*)
- [3] Yeo, G.T., Song, D.W., Dinwoodie, J., Roe, M. Weighting the Competitiveness Factors for Container Ports under Conflicting Interests. 2010, *Journal of the Operational Research Society*, 61, 1249 -1257, ISSN 0160 5682. (ABS***; impact 1.350; ABDC 2010 A)
- [4] Yeo, G.T. , Roe, M., Dinwoodie, J. Measuring the competitiveness of container ports: logisticians' perspectives. 2011. *European Journal of Marketing*, 45(3), 455-470. Doi 10.1108/030905611111107276 ISSN 0309 0566. (ABS***; impact 0.965; ABDC2010 A)
- [5] Dinwoodie, J. Xu, J. Case studies in logistics: a review and tentative taxonomy. 2008. *International Journal of Logistics Research and Applications*, 11(5), 393-408. ISSN 1367-5567. (ABS**; impact 0.357;ABDC2010 B)
- [6] Dinwoodie, J., Tuck S., Knowles, H., Benhin J., Sansom, M. Sustainable development of maritime operations in ports. 2012. *Business Strategy and the Environment*. 21, 111–126 ISSN 1099 0836 DOI: 10.1002/bse.718. (ABS**; impact 1.96; ABDC2010 A)

4. Details of the impact (indicative maximum 750 words)

FHC oversees maritime operations in Falmouth Bay but in 2008 commercial activities were threatened by increasingly complex environmental regulations and fragile stakeholder relations. By ensuring that maritime operations, which include anchoring and bunkering, are undertaken more sustainably this research helped to safeguard the commercial revenues that they generate. The KTP increased the breadth of information available and the extent of dissemination, as FHC annual reports in 2009 and 2010 added new sections covering corporate social responsibilities [A] and a sustainability section was added to the FHC website. The value of editorial coverage increased from £130k (2008) to £286k (2010) [B]. This research generated 8 meetings with other UK ports to discuss best practice, in depth consultations with 9 stakeholders and 70 meetings with stakeholders. This research created a stakeholder management system and engaged 2400 visitors at a Maritime Museum exhibition [B, C]. Improved stakeholder satisfaction led to a £35k multi-stakeholder project managed by FHC which employed one environmental scientist full time and released 5% of one employee's time previously spent responding to environmental concerns. The KTP recruited and funded a maritime sustainable developments officer (MSDO), a role which is now commercially funded and embedded within FHC [D]. Working with academics and the Harbour Master, the MSDO developed a Port Sustainability Management System (PSMS) which redefined environmental management and monitoring in Falmouth Bay as a business process focused on strategic, tactical and operational processes. This reformulation clarified understanding and documentation of business processes generating data relating to what each process involved, who undertook it, when and why and how long it required. The reformulated management system empowered FHC to ensure compliance, engage proactively with legislators and environmental interest groups, and contribute professionally to good practice and networking [B, E]. In 2008 the reformulated sustainability management system empowered Falmouth port to benefit from its location adjacent to the 5' West boundary of a newly designated Sulphur Emission Control Area (SECA) by ensuring safe, compliant and sustainable bunkering operations in an environmentally

sensitive area. The number of ships calling to take on bunkers before entering the English Channel SECA trebled from 2007 to 2008. Research by MSDO into the environmental impacts of anchoring, bunkering and ballast water exchange assisted compliance and by pinpointing anchoring locations using ship Automatic Identification System data, generated new knowledge and University projects to investigate the location of dead maerl habitats and the impacts of anchoring [F].

The KTP funded the MSDO to engage in PISCES tidal flow modelling to combat possible oil spills which was cascaded to colleagues throughout FHC and GIS training to facilitate monitoring of anchoring locations which was cascaded to two colleagues [B]. FHC took a lead role in a review of the SAC management scheme, discharging its responsibilities as a relevant authority under the habitats regulations. Because of the KTP, sprayings of quays and steps used less damaging chemicals and the water efficiency of laundry facilities increased. The KTP spawned trials to gain information about the scientific impact of re-laying dead maerl beds on the integrity of the Special Area of Conservation [G].

Monitoring and management of invasive species as part of an early warning system helped to protect 5 jobs that harvest 60 tonnes of mussels and oysters locally [B]. Through the KTP FHC became more environmentally engaged, reducing fuel usage by 24488 liters (2008-2010). The KTP helped to protect key activities which created 2 new jobs for marine pilots [B] and to increase annual profit from £61k (pre-KTP) to £107k (end-KTP). Evidence of improved societal trust and confidence in FHC's auditable ability to perform responsibly, openly and accountably was provided when the Marine Management Organization recently approved works for the Falmouth Trial dredge application. MSDO undertakes tasks previously undertaken by the Harbour Master, releasing senior management time (£17kpa); provides specialist advice and information which reduces external consultancy fees (£24kpa); substantially increases publicity and reduced advertising costs (£20kpa) whilst enhancing stakeholder contact (£60kpa). More constructive relationships with an expanded range of environmental interest groups include Natural England who volunteered specialist knowledge in response to proposed legislative changes. MSDO disseminates specialist environmental awareness training and develops training materials for harbour users [B]. Work to develop and disseminate a PSMS to unlock further benefits for ports throughout Devon and Cornwall is ongoing [H, I] and potentially ports globally could benefit from this research, which features in a seminal handbook.

5. Sources to corroborate the impact (indicative maximum of 10 references)

[A] See e.g. *Harbour Commissioners Annual Report, 2009*, p.14, Chief Executive's Report, available at: http://www.falmouthport.co.uk/commercial/html/documents/AnnualReport2009_000.pdf. Accessed 15.03.13.

[B] Falmouth Harbour Commissioners, KTP007098, Final Report: Results for the Company Partner.

[C] Comments by Mark Sansom, Harbour Master on winning the ESRC Best Application of Social Sciences in a KTP, 2012. See *National award for partnership between Falmouth Harbour Commissioners and Plymouth University*, *Plymouth Evening Herald*. Available at: <http://www.thisisplymouth.co.uk/University-s-partnership-proves-award-winner/story-17626488-detail/story.html>. Accessed 19.12.12.

[D] Employment of a full time Marine Sustainable Developments Officer (p.3) *Strategy Document and Business Review Incorporating Report on Activities for 2011*. Published September 2012 Falmouth Harbour Commissioners. Available at: <http://www.falmouthport.co.uk/commercial/html/documents/AnnualReport2011.pdf>. Accessed 15.03.13

[E] The KTP helped FHC to develop knowledge and expertise to identify potential environmental and socio-economic impacts to the harbour and the region. See *ESRC researchers winning KTP Awards*. Available at: <http://www.esrc.ac.uk/impacts-and-findings/features-casestudies/features/24174/esrc-researchers-winning-ktp-awards.aspx>.

Accessed 18.03.13.

[F] On-going projects with Plymouth University students following 2010 projects which assessed the environmental impact of Falmouth anchoring vessels (FHC, 2012, op. cit.[D], p.27)

[G] Scientific trials to gain information about the scientific impact of re-laying dead maerl beds on the integrity of the Special Area of Conservation undertaken with PU Marine Institute (FHC, 2012, op. cit. [D], p.28).

[H] Developing a Port Sustainability Management System for Smaller Ports in Cornwall and Devon CUC Research Programme ESF Postgraduate Case study www.cuc.ac.uk Accessed 28.11.12.

[I] PhD project to analyse sustainability systems for the local port sector. See *Falmouth Harbour Commissioners Environmental Policy*. Available at: <http://www.falmouthport.co.uk/commercial/html/environmental-policy.php>. Accessed 18.03.13.

[J] Dinwoodie, J., Tuck S., and Knowles, H. (2012) A systems approach to assessing the environmental impact of maritime operations in smaller ports. Chapter 14 in: D-W. Song, and P. Panayides "*Maritime Logistics: Contemporary Issues*", Emerald, Bingley, UK.