Institution:
University of Portsmouth

Unit of Assessment:
19 Business and Management Studies

Title of case study:
University of Portsmouth Helps Royal Navy Improve its Medium and Long-Term Manpower Planning Capabilities

1. Summary of the impact

Portsmouth Business School's military manpower forecasting model was developed with the Royal Navy from 1997 to provide medium and long-term manpower projections. The Naval Manning Agency has used this model since 2000. Work by Jaffry/Rennison in 2009 and 2010 employed this model to establish that a proposed housing scheme was unviable; led to revised inflation forecasts being used in the planning process; and contributed to the integration of the Regular Service and the Reserve. In a wider Armed Forces context, a tri-service manpower model was developed by the Defence Analytical Services Agency (DASA) in conjunction with Jaffry, to improve the analytical rigour of military manpower planning in the light of continuing defence budget cuts.

2. Underpinning research

Manpower planning in the Royal Navy (RN) is complicated by four key factors:

- the sheer size of the organisation (as at August 2013 there were 31,020 in the Naval Service, 6,940 in the Royal marines, and a further 2,570 in the Royal Naval Reserve;
- the high technical levels of expertise required in some operational spheres;
- the specifics of ratings and non-officer ranks recruitment (ratings and other ranks enter the Naval Service on a full career contract for 18 years from their date of entry or up to and including their 40th birthday);
- and continued pressures on the defence budget which has had a major impact on recruitment and retention practices in the Senior Service (in 1997 manpower levels stood at 45,100 - 8,000 Officers and 37,200 Ratings and other ranks).

These factors prompted the Naval Manning Agency to contract Jaffry and Capon from Portsmouth Business School to develop a Navy Manpower Model in 1997. The brief was to develop a model that could provide medium and long-term manpower projections for both the Navy as a whole and for various sub-categories (Naval officer, marine etc) therein, and in this way to improve operational efficiency.

Work undertaken by Jaffry *et al.* has proceeded in three stages. ***First*****,** a dynamic autoregressive distributive lag econometric model of manpower planning was developed in collaboration with the RN's Second Sea Lord's Department (Grants 1 and 2). This addressed the shortcomings of traditional methods of workforce planning, introducing modern management practice and cost control to address the increasingly complex issues of workforce supply and deployment as demanded by the RN. A paper drawn from this research reviewed the use of planning coefficients that were derived from 'anecdotal evidence' and 'expert opinion' and contested the conclusions of the 1994 MoD Defence Cost Study, which had concluded that efficient manpower utilisation could not be achieved using traditional methods (Jaffry and Capon, 2005). ***Second*****,** RN manpower planning was further enhanced by reconfiguring the information systems that track the movement and payment of individual personnel (Grants 2 and 3). This provided greater precision in manning and budgetary systems, and one feature of this research was the focus on developing strategies for the retention of highly trained personnel. Crucially, as was shown in Jaffry *et al.* (2009), external (pull) factors appeared to exert a significant effect on quit rates. Further econometric analysis using

a discrete time duration analysis methodology that examined the number of years that ratings serve in the RN until deciding to terminate their contract demonstrated the importance of demographic and economic factors (such as pay and civilian employment opportunities) in the stay/quit decision. **More recently**, commissioned research has reviewed deployment patterns for Naval personnel within each budgetary area, mapping these against future commitments so as to predict future manning levels and costs within each budgetary area. It was possible to document future movements in manpower cost as personnel flowed through the Naval manning system (Grant 4). The methodological and empirical basis of this analysis is extended through Jaffry *et al.* (2010; 2012), which estimated the unemployment elasticity for male ratings to be -0.65 (female -0.51). This is significantly higher than unemployment elasticities reported for the US Navy and implies a greater staff turnover in the UK service. The research also found that male ratings were more likely than females to quit the service due to a lack of promotion to higher ranks and/or as a result of a hectic operational tempo. This, plus the related finding that frequency of sea/shore deployment exerts a significant effect with respect to quits and separation for both genders has important manpower implications that warrant further investigation.

Portsmouth Staff Involved:
Dr. Shabbar Jaffry 1997-2013 (Principal Lecturer, Reader and, since 2009, Professor of Economics),
Nick Capon 1997-2005 (Principal Lecturer in Enterprise and Innovation);
Dr. Yaseen Ghulam 2005-2013 (Senior Lecturer in Economics);
Dr. Alex Apostolakis 2005-2013 (Senior Lecturer in Economics).

3. References to the research

1. Jaffry, S ; Capon, N. (2005). Alternative Methods of Forecasting Risks in Naval Manpower Planning. *International Journal of Forecasting*, 21(1), pp. 73-85. DOI: 10.1016/j.ijforecast.2004.05.003. ABS 3* Journal.
2. Jaffry, S.; Ghulam, Y.; Apostolakis, A. (2009). Job Transitions in the Royal Navy (2009), *Defence and Peace Economics*, 20(3), pp. 233-251. DOI: 10.1080/10242690802001904 ABS 2* Journal.
3. Jaffry, S.; Ghulam, Y.; Apostolakis, A. (2010). Analysing Quits and Separations from the Royal Navy. *Defence and Peace Economics*, 21(3), pp. 207-228. DOI: 10.1080/10242690903568959. ABS 2* Journal. Ref2 output: 19-SJ-003
4. Jaffry, S.; Ghulam, Y.; Apostolakis, A. (2012). Explaining Early Exit Rates from the Royal Navy, *Defence and Peace Economics*, online pp. 1-31, ISSN 1024-2694, DOI: 10.1080/10242694.2012.695035. ABS 2* Journal. Ref2 output: 19-SJ-002

Grant 1: Capon, N., Jaffry, S. (Portsmouth Principal Investigators [PI]). Risk in Naval Manpower Planning. 1997 – 1999, Ministry of Defence, Value: £80k
Grant 2: Jaffry, S. (PI). Naval Manpower Econometric Model, 2000-2002, Ministry of Defence, Value: £90k.
Grant 3: (PI). Naval Manpower Retention Project, 2003-2005, Ministry of Defence, Value: £75k
Grant 4: (PI). Naval Manpower Project, 2005-2006, Ministry of Defence, Value: £30k

4. Details of the impact

The 'Portsmouth' model has been employed by the Naval Manning Agency to support manpower planning since 2000 and 'has been found to be surprisingly accurate even in the short term' (Corroborating Source – CS1). This has had two consequences. First, it has enabled the RN to modify policy to realise labour efficiency cost-savings. Secondly, it has enabled **DASA** (Defence Analytical Services Agency, the agency responsible for providing defence statistics and policy advice to the government and the armed forces) to provide more accurate tri-service manpower predictions over the medium-long term ('Tri-Service/DESA Impact').

1. The Naval Impact:

In 2000, the RN seconded Commander Ross Rennison to work with Dr. Jaffry on further refining the 'Portsmouth model.' This collaboration initially focussed upon improving the JOBSTAT database which held detailed deployment, pay, and personal information on all Naval personnel which underpinned the model. This task was completed prior to the 2008 'Impact window', and 'provided the Navy with a rich source of management information that could be readily distilled and compiled to meet the needs of the latest enquiry' (Corroborating Person – CP1). This was swiftly exploited by the then Assistant Director of the RN Human Resources Policy and Planning team who, in the early part of 2008, set the Jaffry/Rennison team the task of producing a series of freestanding case studies between 2008 and 2010 to provide 'support for the evidence based policies needed to address pressing issues at the highest levels within the organisation.' (CP2). Examples of this included:

- *Manning and Training Margin (MTM) review*. Losses are incurred as personnel may be temporarily undeployable [ie: due to illness, resettlement etc.] and, as this may affect operational capacity, a 'margin' is built into budgets to prevent such an occurrence. As the margin is the most volatile component of the manpower equation it is therefore the most difficult to estimate and cost. The Jaffry/Rennison team were tasked with assessing the degree of MTM reporting. Their investigation suggested underreporting of around 25% (equivalent to 1,200 people) and saw them advise that the MTM element 'in the statement of planning liability should be revisited' (CS3 – p.47)
- *Cost growth in service pay.* The data compiled to support 'Portsmouth model' was employed to demonstrate that pay growth was double the assumed rate used in the then planning process due to institutionalised wage inflation (2.5% above inflation). These findings informed the work of the Force Structure Analysis Team (Policy and Planning Analysis Group) and resulted in adjustments being made in terms of the assumed wage inflation used by the centre in forecasting future manpower costs (CS4).
- *Proposed Housing Loan Scheme. T*he RN also requested Jaffry/Rennison to determine the probable period individuals would spend in their base port in order to identify the likely take-up (and costs) of a proposed housing loan scheme as part of the Strategic Remuneration Review (SSR). The team estimated that as around 70% of staff would be deployed in their home port over a two year period (40% over a three year period) this made the proposed housing scheme unviable. The scheme was not introduced (CS5).

In mid-2009, following discussions with the new Commander of the Maritime Reserves (Reserve personnel had to be at 28 days readiness to supplement the regular service in the event of unexpected contingencies), the decision was taken to adapt JOBSTATS structure to incorporate the Maritime Reserves. 'This was a significant contribution to the further integration of the Reserve and Regular Service.... [and] it is much to the credit of Professor Jaffry that the flexibility in the original design of JOBSTATS, which he had set out, made this transition for the Reserves so straightforward' (CP3). Furthermore, CP2 in their letter of 17/5/2013 to the Dean of the Portsmouth Business School, notes that 'this field of activity, initiated by the work of Professor Jaffry's team, continues to go from strength to strength.'

2. The Tri-Service/DESA Impact:

Although Dr. Jaffry had undertaken some experimental modelling of RAF and Army manpower needs in 2006, these two branches of the Armed Forces were unwilling to financially support further refinement of the model at that time. Nevertheless, by early 2008 the Senior Economic Advisor (DESA) was recommending in an internal memo distributed to all tri-Service Directors of Manning and the MOD Centre that 'the success of the [Portsmouth] work leads me to encourage use of the approach in all three services as well as the Centre [DASA].' (CS1). This led to DESA inviting the Portsmouth team to brief the Technical Cooperation Programme (TTCP) Workforce Modelling and Analysis Working Group comprising military manpower planners drawn from Australia, New Zealand, Canada and the United States, on 27 May 2009. Feedback from the Head

of Personnel Statistics and Analysis at DESA to Dr. Jaffry noted that 'the TTCP nations found your contributions interesting and highly relevant to their own situations' (CP4)[1]. At the national level, DASA – in line with the Senior Economic Advisor's 2008 recommendations – 'developed a tri-service manpower demand model for trained personnel in conjunction with Dr Jaffry, University of Portsmouth' (CS2). In early 2010 this model was used to rebut findings from RUSI (the Royal United Services Institute for Defence and Security Studies) and Professor Malcolm Chambers that a 10-15% real cut in the defence budget would lead to a reduction of 20% in trained service personnel (33,080 staff) between 2010/1 and 2016/7. Instead, the DASA/Portsmouth model estimated and advised tri-Services Directors that a forces reduction of 7% (11,000 staff) by 2012/3 and 13% (20,000 staff) by 2016/7 was more likely (CS2).

5. Sources to corroborate the impact

Corroborating Source

CS1: **Internal Memo from Senior Economic Advisor, Defence Analytical Services Agency to all tri-Service Directors of Manning and the MOD Centre**, 18 February 2008.

CS2: **DESA Internal Memorandum Relating to the 2010 RUSI/Chambers Report** in the press (13th January 2010).

CS3: **The Manning and Training Margin (MTM) Review 2008**. Briefing.

CS4: **Exploring Factors that May Contribute to Growth in the Forecast Cost of the Naval Trained Strength (TS)**. Briefing Note 1. Restricted Report, September 2009.

CS5: **Length of Base Port Assignment Periods Experienced by Naval Service Personnel Between April 1997 and October 2006**). Restricted Report. September 2009.

Corroborating Person

CP1: **Royal Navy. Captain with Responsibility for Personnel Strategy**. *REPORTER*

CP2: **Royal Navy, Commander, Assistant Director of the Human Resources Policy and Planning Team**. *REPORTER* (and participant in the sense he commissioned various case studies from the team).

CP3: **Royal Navy. Commander, with Responsibility for the Maritime Reserves** (2009-2011). *REPORTER* (and participant in the sense he commissioned a case study on Reserves from the team).

CP4: **Ministry of Defence. Head of Personnel Statistics and Analysis, Defence Analytical Services and Advice (DESA)**. *REPORTER*

[1] It has unfortunately been impossible to corroborate if military manpower planners in these other nations have adopted variants of the Portsmouth model on national security grounds.