Institution: University of Strathclyde

Unit of Assessment: Sub-panel 19 – Business and Management Studies

Title of case study: Improved productivity and growth through the use of new performance measurement systems

1. Summary of the impact

Research into Performance Measurement Systems conducted by the Strathclyde Institute for Operations Management (SIOM) between 1997 and 2013 has led to new knowledge which in turn has been applied in companies. These new insights have resulted in significant economic impacts for companies both large and small. The reach has been significant, with economic and social improvements in approximately 170 companies, and indirectly to over 1000 companies through intermediaries such as Scottish Enterprise and the Manufacturing Advisory Service. This case study focuses on impact generated since 2008 using companies of different sizes and from different sectors to illustrate the financial and other benefits realised from improved performance measurement and management systems. Some companies have achieved benefits through KTP projects, while other organisations focused on consultancy engagements. In addition, a large scale executive education programme developed around operations and performance improvement has allowed companies such as Babcock International Group to deploy the new knowledge about performance measurement systems throughout its international organisation, reaping financial and organisational benefits.

2. Underpinning research

Background and Key Findings

The new knowledge that underpins this impact was developed through a series of EPSRC and EU funded research projects between 1997 and 2013. At a basic level, the research team were interested in developing an understanding of:

- What makes high performing organisations different?
- What performance measurement and management practices and behaviours can help organisations to translate strategy into action?

Initial EPSRC research conducted with ICI, GE Caledonian and Clyde Blowers Ltd. identified performance measurement and management as a key barrier to business wide integration, constraining overall performance. This led to further work that explored performance management of business and process-based teams [5,6]. This work was funded by the EPSRC and carried out collaboratively with companies including IBM, McVities and Rolls-Royce. The research established clear guidelines on the design of performance measurement systems for teams [4]. The work was then implemented in Highland Spring through the EPSRC Researchers into Industry scheme. Further research concluded that performance measurement and management practices of organisations are shaped by the mental models and social forces within the organisation. Those organisations with a holistic integrated understanding of the managerial system perform better as they demonstrate better tendencies towards learning and adaption to their environment [2,3].

In conducting this research, the research team engaged with both small and large organisations, testing out their new theories and implementing integrated performance measurement systems in the companies. Some companies took part in collaborative, funded research (e.g. IBM, McVities, Rolls-Royce, ICI, GE, Clyde Blowers), while other organisations used the KTP scheme as a mechanism to engage with the research (e.g. Highland Spring, Houston Warehousing, Alcan, Blairs). Other companies engaged through short consultancy projects (e.g. Bullet Express, Babcock International Group) whilst a significant number used student projects and placements (e.g. Rolls Royce, Scottish Police, Landis+Gyr, Aberdeen Council, Abbey, National Australia Group, Hilton) to transfer knowledge. This in-depth, on the ground, experience of implementing performance measurement systems led to a better understanding of the interplay between

performance measurement, management styles and organisational culture. Indeed the findings of the case studies conducted with 30 manufacturing companies established that the measurement of business process performance is a key requirement and emphasised the need to deploy the business process measures to the teams who operate these processes.

The research on process and people-focused performance measurement and management systems continued [e.g. reference 1] and explored how performance may be measured and managed in extended collaborative enterprises such as supply chains and value chains. This led to new insights concerning performance measurement and management challenges in collaborative enterprises.

Key researchers

Prof. Umit Bititci (Senior Lecturer in 1996, Reader in 2000 and Professor in 2002); Dr Jillian MacBryde (Lecturer, 1998; Senior Lecturer, 2004; Reader, 2011); Dr Kepa Mendibil (Researcher in 1998 and Lecturer since 2005); Dr Nuran Acur (Researcher 1998-2001, Senior lecturer since 2008). As the work developed more Strathclyde researchers were brought into the interdisciplinary group, with Dr Steve Paton, Dr David Mackay, Professor Fran Ackermann, Dr Robert van der Meer, Dr Farhad Shafti, Dr Marissa Smith, Dr Aylin Ates, and Dr Catherine McGuire all joining the collaborative research and knowledge exchange activity.

3. References to the research

1. MacBryde, J., Paton, S., Grant, N., & Bayliss, M. (2012) "Performance measurement driving change: a case from the defence sector", International Journal of Productivity and Performance Management, Vol. 61, Issue 5, pp.462 – 482
2. Bititci, U., Ackermann, F., Ates, A., Bourne, M., Davies, J., Gibb, S., MacBryde, J.C., Mackay, D., Maguire, C., Shafti, F., & Van Der Meer, R.B. (2011), "Managerial Processes: Business Process that Sustain Performance", International Journal of Operations and Production Management, Vol 31, Issue 8, pp.851-891
3. Bititci, U., Ackermann, F., Ates, A., Bourne, M., Davies, J., Gibb, S., MacBryde, J.C., Mackay, D., Maguire, C., Shafti, F., & Van der Meer, R.B. (2011) "Managerial processes: an operations management perspective towards dynamic capabilities", Production Planning and Control, Vol 22, Issue 2, pp.157-173
4. MacBryde J.C., & Mendibil K. (2006) "Factors that affect the design and implementation of team-based performance measurement systems", International Journal of Productivity and Performance Management, Vol 55, No 2. pp.118-142
5. MacBryde, J.C., & Mendibil K. (2005) "Designing Performance Measurement Systems for Teams", Production Planning and Control, Vol 16, No. 2, pp.208-225
6. MacBryde J.C. & Mendibil K. (2003) "Designing Performance Measurement Systems for Teams: Theory and Practice", Management Decision, Vol 41, No. 8, pp.722-733

Research grants totalling around £6M underpinned this research between 1997 and 2013 including: EPSRC GR/L73715 ROPA: Use Of Active Monitoring Techniques To Maintain Reliability Of Business Processes (Biticti, 1997-1998); EPSRC GR/M98203/01 Measuring and Managing Team Performance (MacBryde, Carrie, Bititci 2000-2001); EPSRC GR/T25897/01 Understanding and Managing the Manage Processes (Bititci, MacBryde, Davies, Ackerman, Gibb, van der Meer, Shafti 2005-2008); EU FP7 FutureSME (Bititci, MacBryde & Antony 2009-2013).

4. Details of the impact

Process/events from research to impact

As evidenced above, an extensive body of research conducted by researchers within the Strathclyde Institute of Operations Management (SIOM) resulted in the development of performance measurement and management models and frameworks. Insights from this work were published in leading international journals but also operationalised through practical workbooks, audit tools and self-assessment forms to make it easier for practitioners to benefit from

the research. In particular, engaging with industry via industry facing seminars organised by CompetitiveScotland.com (a networking organisation dedicated to facilitating companies operating in Scotland) along with SIOM's own industrial seminar series, became a powerful mechanism for the dissemination of key research findings widely to industry. Such events led to interest from workshop and event participants leading in turn to further consultancy agreements (e.g. Allied Distillers) and KTP projects (e.g. Houston Co-Pack, Korway Foods, Simpson Labels, Campbell & Kennedy) to embed the frameworks and the associated tools. This case study features impact generated for an illustrative selection of companies during the REF period.

Description of impact

The Strathclyde research was instrumental in reshaping and reengineering the performance measurement and management practices in a large number of organisations. Records of interventions show that approximately 170 companies have directly benefited from working with the Strathclyde team (Source 6). The adoption of the performance measurement research by intermediary organisations including Scottish Enterprise, the Scottish Manufacturing Advisory Service and research partners across Europe (e.g. The Lean Institute (Poland), Ernst & Young (Italy) and Tsunami (Ireland)) has also created conditions for the further diffusion of impact to a much larger number of organisations – in the region of 1000 (Source 6 and 3). In addition, the European wide FP7 FutureSME project (2009-2013) led by the Strathclyde team developed and delivered a €6M programme to improve the competitive capabilities of European Manufacturing SMEs. The research described above, and particularly the maturity models, team performance tools and visual performance measurement approaches, formed the foundations of the project. Over the duration of the project, it delivered detailed longitudinal interventions with 13 European SMEs and also involving performance measurement and management maturity diagnostic with 63 manufacturing SMEs across Turkey, Italy, Czech Republic, Poland, Spain, Slovakia, UK and Ireland (Source 7). The training programme developed was awarded the European Training Programme of the Year Medal by the Polish Chamber of Commerce.

The impact of these changes began to be evident between 2008 and 2013 in the form of improved productivity and growth within the collaborating organisations. Benefits for the companies has been significant as the Managing Director of Linn Products explains:

"We worked with the Strathclyde team to adopt the performance measurement and management methods and tools developed through their research. The visual management approach has transformed the way we manage the strategy and performance of our business, which resulted in the company exceeding its growth objectives" (Linn Products; Source 2).

For some organisations the interventions have been timely helping them survive tough economic conditions:

*"Our consultant has introduced us to the visual performance management tools developed at Strathclyde. It helped us survive through a deep recession and made us stronger for growth in the future" (*Roche Manufacturing; Source 4*.)*

Highland Spring provides a detailed example of an organisation where the impact has been extensive. A long-term relationship was developed with Highland Spring via various mechanisms which have included 6 KTP projects, jointly funded research (funded through the EPSRC and EU) and numerous student projects and placements, as well as a number of consultancy assignments. Together these interventions have ensured the adoption of the key research findings within the Highland Spring business, which resulted in the delivery of relevant, timely, consistent and visible performance information. This in turn facilitated more meaningful strategic and operational dialogue to take place within the organisation resulting in more informed and confident decision making, as well as more focused action at all levels. This resulted in improved efficiencies across sales, manufacturing, materials and distribution operations, as well as improved customer service levels. During just one KTP project (between 2008-2010), Highland Spring Ltd. saw improvements in productivity (2%), 150% increase in turnover (from £54M to £81M) and a 80% increase in the workforce (107 new employees) (Source 8). Further acquisitions resulted in the business growing

to become the UK's number 1 bottled water producer with a turnover of c. £100M and 450 people (Source 1). Daniel Muir of Highland Spring has commented on the importance of the Strathclyde research in helping achieve the improvements:

"*We've had better planning, better control, better use of resources as well, so probably less wastage. So a number of benefits. It also went on to be the basis for further development that could take place that's helped with reporting and performance improvement throughout the operations side of the business. I think it has benefited the company. We also turn to Strathclyde because we have that relationship, and definitely that is valued within the company."* (Source 1)

So successful was the use of performance measurement at Highland Spring, the Scottish Manufacturing Advisory Service (SMAS) has been using Highland Spring as a best practice example and encouraging Scottish manufacturers to adopt similar solutions. To date over 50 other Scottish companies have been introduced to the concepts and systems that underpin Highland Spring's performance measurement and management systems (through the SMAS network).

More recently Strathclyde has been expanding the reach of the performance measurement research whilst working with **Babcock International Group**. Strathclyde developed an executive development programme with a module on Operations and Performance Improvement at its core. Since 2009 over 800 managers from the Babcock organisation have been through this training. This has had a profound effect on the multinational business, which has now embraced the Strathclyde performance measurement frameworks and tools throughout its business.

*"The partnership with Strathclyde works so well because they tailor it to our company. Together, we have provided the senior teams in each of our divisions with a toolset and knowledge that have helped shape our corporate strategy and improved collaboration across the business." (*Source 5*)*.

In parallel to the operations and performance training provided, Strathclyde researchers also worked with managers from different parts of the Babcock International Group to improve performance and productivity. As an example, the successful transformation of Her Majesty's Naval Base-Clyde (HMNB-C) resulted in changes to working practices and significant cost savings. Between 2002 and 2012 the total running costs of the Naval Base were reduce by over £190M (whilst Babcock still maintained profit). From 2002-2005 much of the cost saving came from renegotiation of subcontracts and rationalisation of expensive maintenance regimes, but from 2005-2012 the change was carried out using performance measurement as a key lever in the change process (Source 9).

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

1. A statement from the Customer Supply and Logistics Manager, Highland Spring
2. A statement from the Managing Director, Linn Products.
3. Former Director of Scottish Manufacturing Advisory Service can be contacted to corroborate the number companies exposed to the key research findings
4. A statement from the Managing Director/Owner, Roche Manufacturing
5. A statement from the Executive Sponsor, Babcock Academy
6. Records of interactions with companies recorded by CompetitiveScotland.com
7. FurtureSME end of project report
8. KTP project end of project report
9. The following publication can corroborate the impact on Her Majesty's Naval Base-Clyde (HMNB-C) - MacBryde, J., Paton, S., Grant, N., & Bayliss, M. (2012) "Performance measurement driving change: a case from the defence sector", International Journal of Productivity and Performance Management, Vol. 61, Issue 5, pp.462 – 482