

Impact case study (REF3)

Institution: Heriot-Watt University		
Unit of Assessment: C17 Business & Management		
Title of case study: Enhancing operational and financial performance by improving how organisations measure and manage performance		
Period when the underpinning research was undertaken: 2014 to 2020		
Details of staff conducting the underpinning research from the submitting unit:		
Name(s):	Role(s) (e.g. job title):	Period(s) employed by submitting HEI:
Umit S Bititci	Professor	Jan 2014 – present
Period when the claimed impact occurred: 2014 – Dec 2020		
Is this case study continued from a case study submitted in 2014? Yes		
<p>1. Summary of the impact Heriot-Watt University research developed an approach that helps organisations to re-design management systems quickly by enabling dialogue, participation and informed decision making, with everyone working towards shared objectives, which has been widely adopted in the UK, Turkey and Estonia, helping deliver an improved competitive advantage. The research has been used in businesses of significant scale, including Clyde Blowers, tripling its GBP670,000,000 investment portfolio, and has impacted the financial performance of ca.90 businesses employing ca. 10,000 staff.</p>		
<p>2. Underpinning research Bititci has been researching how organisations measure and manage performance since 1993. The new development of his work is about establishing organisational control theory [3.6, 3.2] as the basis for measuring and managing organisational performance, an area that did not previously have strong theoretical foundations.</p> <p>Research by Bititci developed the first insight into the three control systems (vertical, horizontal and circular) that underpin the management systems of organisations. This research resulted in a range of practical and prescriptive approaches and tools, that included an online diagnostic tool; a performance measurement and management framework and a continuous improvement framework based on lean management principles. The research that underpins this impact was developed over two phases:</p> <p>Phase 1 (Consultancy and KTP, 2014/17) Working with 16 companies (such as Clyde Blowers, Pentland Precision, Linn Products), this phase explored the implementation of the above tools through action research. The aim was to understand how implementing the three control systems impacted on management practices and ultimately on the performance of the organisations. This research revealed that a prescriptive approach did not work as well as originally intended. However, it was observed that adopting, localising and internalising the main principles to suit the particular needs on an individual company was a lot more effective. This in turn led to refinement of the original prescriptive tools and techniques into a set of customisable principles and guidelines.</p> <p>Phase 2 (Innovate UK, Consultancy, KTP, RAEng, 2017/20) A new theoretical framework was developed and set out in his book [3.6], based on Technical and Social controls, and further</p>		

developed in his publications [3.1, 3.2, 3.4, 3.5] and funded projects involving a variety of businesses, including start-ups. The significance of the findings is that this framework can now enable firms and managers to understand and explain organisations' behaviours in ways that could not previously be done [3.2]. The key research outcome was the development of an organisational capabilities framework to measure and enhance both the operating and dynamic capabilities of organisations [3.6], Bititci's three control systems approach:

- The **Vertical Control System** enables the organisation to deploy organisational goals and priorities to key parts of the organisation (divisions, functions, processes, teams and people) to ensure organisational alignment;
- The **Horizontal Control System** enables the organisation to manage the flow of work throughout the organisations and its supply chain, i.e. suppliers' suppliers through to customers' customers;
- The **Circular Control System** enables the organisation to continuously improve and transform.

Research demonstrated that these three control systems together with his organisational control model comprising of technical and social controls, when purposefully implemented:

- Makes three control routines explicit;
- Ensures that the three control routines, are integrated and mutually complimentary;
- Promotes the use of simple visual management techniques;
- Makes performance constraints more transparent;
- Engages people in a conversation about the performance of the organisation;
- Enables more agile performance reviews and redeployment of objectives;
- Enables the organisation to respond to opportunities and threats faster than their competitors.

Bititci's research showed that when these three control systems were integrated and deployed through simple accessible visual approaches, coupled with an appropriate balance between social and technical controls, they enable organisations to engage people in a dialogue about the performance of the organisation, which results in increased levels of participation, innovation, problem solving and, ultimately, improved operational and financial performance.

3. References to the research

[3.1] Bititci, US, Bourne, M, (Farris) Cross, JA, Nudurupati, SS & Sang, K 2018, 'Editorial: Towards a Theoretical Foundation for Performance Measurement and Management', *International Journal of Management Reviews*, vol. 20, no. 3, pp. 653-660.

<https://doi.org/10.1111/ijmr.12185>

[3.2] Smith, M & Bititci, US 2017, 'Interplay between performance measurement and management, employee engagement and performance', *International Journal of Operations and Production Management*, vol. 37, no. 9, pp. 1207-1228. <https://doi.org/10.1108/IJOPM-06-2015-0313>

[3.3] Bititci, U, Cocca, P & Ates, A 2016, 'Impact of visual performance management systems on the performance management practices of organisations', *International Journal of Production Research*, vol. 54, no. 6, pp. 1571-1593. <https://doi.org/10.1080/00207543.2015.1005770>

[3.4] Bititci, US, Garengo, P, Ates, A & Nudurupati, SS 2015, 'Value of maturity models in performance measurement', *International Journal of Production Research*, vol. 53, no. 10, pp. 3062-3085. <https://doi.org/10.1080/00207543.2014.970709>

[3.5] Melnyk, SA, Bititci, U, Platts, K, Tobias, J & Andersen, B 2014, 'Is performance measurement and management fit for the future?', *Management Accounting Research*, vol. 25, no. 2, pp. 173-186. <https://doi.org/10.1016/j.mar.2013.07.007>

[3.6] Bititci, US (ed.) 2015, *Managing Business Performance: The Science and The Art*. Wiley. <https://doi.org/10.1002/9781119166542>

4. Details of the impact

The impact described here took place throughout 2014-2020. For many years, organisations in the global marketplace have been looking for ways of developing management routines that would enable them to respond to opportunities and threats quickly. Many different types of company, large and small, realise that they need to be more agile, if they are to survive and thrive. Extant performance management approaches tend not to engage a wide cross-section of people in the organisation making it difficult, if not impossible, to align efforts which in turn impinges on an organisation's responsiveness, productivity and limits capacity for future growth.

The impact of the research presented above resulted from collaborative work between 2014 and 2018 through long-term initiatives with Clyde Blowers Capital, Linn Products, Optos, and funded projects with Pentland Precision (2015/17-KTP), Highland Spring (2015/17-Industry Funded Research), RL Engineering (2016/18-KTP) as well as relationships with industry support agencies/consultancy companies who adopted Bititci's approach.

There were a number of key engagement routes to impact:

- Executive Education series between 2014 and 2019;
- Bititci's book *Managing Business Performance: the Science and the Art* (2015);
- PMA 2016 conference in Edinburgh, where a key contact was made with industry support bodies, including Tulemusjuhtimine OÜ in Estonia.
- Engagement with BEYSAD and DTA Consulting in Turkey 2015-2019
- Royal Academy of Engineering Funded project in Turkey in 2019-2020.

In some cases, Bititci directly advised and trained organisations through consultancy assignments or KTP funded projects to enable the companies implement the approaches developed in the research. In other cases, he advised and trained intermediaries, such as the Scottish Manufacturing Advisory Service, FuturePositive Ltd, Tulemusjuhtimine OÜ and BEYSAD, DTA Consulting, LogoSoft, to train advisors and consultants in the deployment of his approach.

Organisations reported significant benefits from these interventions:

- Clearer goals and priorities shared and understood throughout the organisation;
- A systematic, routinised and integrated approach to managing strategy (the vertical control system), operations (the horizontal control system) and continuous improvement (the horizontal control system);
- Ability to detect, review and respond to changes much more quickly;
- Developing a shared understanding of what 'good' looks like in their sector/business;
- Developing enhancement and investment plans with greater confidence;
- Monitoring and reviewing enhancement projects more systematically, ensuring that they deliver expected business benefits;
- Creating more sustainable business models and growth strategies.

These outcomes led to measurable financial benefits, either directly, as a result of Bititci working with them, or indirectly, as a result of adopting his work through third party/intermediary organisations. Examples of direct impact include:

Friterm [5.1] – Friterm is based in Turkey, manufacturing heat exchangers for commercial and industrial air conditioning systems, employing ca. 305 people. The company initially engaged with Bititci's work through the FutureSME project. Bititci worked with the company following the project guiding them through development adoption, adaptation and implementation of the principles emerging from this work. This included implementation of visual management that served to focus improvement activities of the company and lead them to adopt lean and quick response manufacturing techniques. In 2017 the company invested and moved into purpose-built premises to enable them to more effectively realise the benefits of these approaches. Between 2010 and 2019, whilst the company turnover grew modestly from EUR24,000,000 to EUR30,000,000 its EBITDA (value) substantially increased from 6% to 17%.

Clyde Blowers Capital (CBC) [5.2] - Based in the UK, CBC is a mid-sized equity investment fund. Between 2013 and 2015 Bititci was retained by CBC to support the development of CBCs Operating Model. The Operating Model systemises how CBC acquires and manages growth of the companies it invests in. Over a three-year period Bititci advised on the development of the Operating model incorporating components from his work. Since 2014 CBC's portfolio has enjoyed a circa 4x return. This return was delivered through interventions made using this approach. For example, between 2014 and 2018 interventions in EMG resulted in 20% and 30% growth in OEM and aftermarket sales respectively as well as delivering a 6% improvement in margins.

Other organisations he advised and trained include Pentland Precision, who reported a [text removed for publication] increase in annual profit as a result [5.3]; and RL Engineering where that resulted in increased revenues, profitability and employment [5.4].

The reach of the impact was broadened through support agencies/consultancy companies adopting Bititci's work, thus extending its impact to many other businesses. For example:

The Scottish Manufacturing Advisory Service (SMAS) [5.5] Bititci was one of the founding members of the Scottish Manufacturing Advisory Board where his earlier work is considered proof of concept for development of SMAS. He served on the SMAS Board between 2006 and 2017. His later work [3.6] on the Science and Art of Business Performance, where a number of SMAS practitioners attended his workshops, underlying principles of his research was widely used by the SMAS practitioners in helping Scottish manufacturing companies transform their performance. Between 2015 and 2020 SMAS's work contributed over GBP125,000,000 value added productivity to the Scottish economy with most of this work being directly in the area of managing business performance. The specific impact of using some of these principles could be exemplified in SMAS's project with Johnsons of Elgin (Inverness), CalaChem (Grangemouth) and Falcon Foods (Stirling) where use of the tools and techniques emerging from Bititci's work resulted in 10-13% productivity improvement, delivering between GBP1,700,000 and GBP11,000,000 in additional profits (depending on the size of the company) as independently published in the SMAS case studies.

Tulemusjuhtimine OÜ [5.6] in Estonia implemented this approach with four selected high-growth companies, ranging between 150-500 employees at the same time training the local consultants on this approach. During 2019 Bititci travelled to Estonia to run workshops with

these companies and deliver training session to local consultants. The local consultant then applied these principals tools and techniques in a further seven companies. The companies involved in this process include Maru Metal (Matal Construction), Natural AS (timber products), Astrec Data OU (cloud service); Janere OÜ (construction equipment). As an example, Maru Metall during 2019 having implemented these approached improved its profits from ca. EUR400,000 (2019) to ca. EUR700,000 (2020).

BEYSAD (White Goods Suppliers Association) together with **DTA Consulting** [5.7] in Turkey used this approach with their client companies, comprised of mainly whitegoods manufacturers (Arcelik, Beko, Vestel) and their supply chains comprising of ca. 500 companies with over 30,000 employees. In fact, the Friterm case study provided above emerged from this relationship, but in this case Bititci worked directly with the company whereas in cases BESAD through services of DTA worked with a range of companies to implement the principles, tools and techniques emerging from Bititci's work.

Future Positive Consulting (FPC) [5.8] a UK-based business improvement consultancy working across the UK and in the USA. FPC's aim is to help businesses achieve sustainable success for all stakeholders. FPC engaged with Bititci's work in 2015 and attended a number of executive education workshops and research seminars and projects. The Managing Director of FPC) emphasised that through this engagement *"his organisation gained new knowledge, insights, tools and techniques... There have been a range of positive benefits for my clients..."*. FPC has used Bititci's principles and techniques with clients such as Iceland Foods, Sainsburys, XPO and DHL Logistics and Hologic, a pharmaceuticals services company. As an example, the impact of this work increased Hologic's (now renamed Tepnel Pharma Services) profit margin from 15% to 44% and reduced costs by around 20% and grew sales by ca.15%.

5. Sources to corroborate the impact

[5.1] Managing Director of Friterm, can be contacted to confirm he implemented the techniques emerging from Bititci's work resulting in an ability to respond to strategic changes much faster.

[5.2] Letter from Clyde Blowers Capital.

[5.3] Final report for KTP project with Pentland Precision ref: KTP009997. Where Bititci's management approached were introduced.

[5.4] Final report for KTP project with RL Engineering ref: KTP010537. Where Bititci's management approached were introduced.

[5.5] Director of Scottish Manufacturing Advisory Service and Head of Business Services at Scottish Enterprise.

[5.6] Director of Tulemusjuhtimine OÜ who have adopted the Bititci approach in their work with growth oriented companies in Estonia.

[5.7] General Manager, BEYSAD.

[5.8] Managing Director, Future Positive Consulting Limited.