

## Impact case study (REF3)

<b>Institution:</b> University of Huddersfield		
<b>Unit of Assessment:</b> UoA 17 – Business and Management Studies		
<b>Title of case study:</b> Deluxe Beds Knowledge Transfer Partnership: The Application of SCRUM in Continuous Improvement		
<b>Period when the underpinning research was undertaken:</b> 2014 - 2020		
<b>Details of staff conducting the underpinning research from the submitting unit:</b>		
<b>Name(s):</b>	<b>Role(s) (e.g. job title):</b>	<b>Period(s) employed by submitting HEI:</b>
Jim Bamford	Senior Lecturer in Operations Management	2012 – present
David Bamford	Professor of Operations Management	2012 – 2019
Iain Reid	Reader in Operations Management	2013 – 2018
Benjamin Dehe	Reader in Operations Management	2012 – 2019
Hossam Haridy	Knowledge Transfer Associate	2015 – 2017
Sammar Javed	Knowledge Transfer Associate	2017-2019
<b>Period when the claimed impact occurred:</b> 2015 - 2020		
<b>Is this case study continued from a case study submitted in 2014?</b> No		
<p><b>1. Summary of the impact</b></p> <p>In the UK manufacturing sector, reducing costs whilst simultaneously maintaining or increasing quality, customer satisfaction and organisational flexibility is seen as being a key strategic economic imperative for organisational survival, particularly in the context of the current political and economic climate.</p> <p>This case study focuses on how research into SCRUM, an agile design-oriented approach to project management which relies on constantly recurring feedback to the client, and associated improvement methodologies has been successfully applied and embedded within a manufacturing organisation through a Knowledge Transfer Partnership. Deluxe Beds Ltd of Huddersfield (turnover of £7,324,957 in 2019), achieved cost savings in excess of £1,800,000 in a 24-month period. There has been additional downstream impact on Deluxe Beds' suppliers, one of which has applied for and received funding (£5,000) to upgrade their IT infrastructure following discussions with Deluxe Beds about their own improvements.</p>		
<p><b>2. Underpinning research</b></p> <p>The research underpinning this case study concentrates on how organisations improve their internal processes and procedures in order to fulfil strategic objectives, or as part of a strategic response to changes in their operating environment. With the current economic and political environment within which UK manufacturing organisations must operate, the chief strategic imperative is cost reduction.</p> <p>In this Case study Lean Manufacturing tools and techniques have been used to assess and improve the operational process and procedures at Deluxe Beds Ltd, a Bed Manufacturer based in Huddersfield. The project was initiated by Dr Sammar Javed based on her experience, following the award of her PhD from Huddersfield Business School, and of working as a volunteer intern at Deluxe Beds. She quickly identified the advantages to the company of working with the Team from Huddersfield which already had extensive Knowledge Transfer</p>		

Partnership (KTP) experience (3.6), and through the 2015 and 2020 research (3.1, 3.2, 3.5), had experience of the application of academic theory into manufacturing and SME's.

Lean is an organisation-wide improvement philosophy which in essence focuses on the removal of waste and non-value adding activity at every stage of every process within the organisation. The 2015 research (3.1) suggests that wholesale implementation of Lean is not appropriate for all manufacturers, and that a partial Lean implementation might more effectively deliver the organisation's strategic objectives. Management teams may not be mature or developed enough to fully adopt the principles of Lean, and at the very least they will need to be adapted. This was one of the challenges at Deluxe Beds. Therefore, this case study involved the partial implementation of Lean process improvement tools and techniques such as process redesign (process mapping, analysis, and improvement), redesign of layout, adoption of standard operating practices, the reduction of waste, and the reduction of inventory through the implementation of Just in Time inventory control and other stock control practices, all of which have been proven to improve the fitness for purpose of the organisation (3.1, 3.3, 3.4, 3.6).

In addition to these Lean tools and techniques, other improvement methodologies were utilised to achieve the strategic improvement that the organisation required. For example, Innovation tools for new product development (such as the Stage Gate model for project management), building in the voice of the customer to the new product development process (Quality Function Deployment, a model for product development and incorporating customer requirements into the design process), and more rigorous and robust decision making processes (Multiple-Criteria Decision Analysis, a methodology to allow the weighting and consideration of numerous factors to aid decision making) have been applied (3.1, 3.3, 3.4).

Not all the Lean Initiatives focussed on the operational level of the organisation, strategy integration tools such as: Hoshin Kanri (a strategic planning process to align the actions of all departments and levels of an organisation with the organisations strategic goals) were also introduced to the senior management team (3.1, 3.4).

In order to manage and accelerate the implementation of the changes necessary to develop the new capabilities that Lean Manufacturing can deliver, the SCRUM Project Management Framework was used. SCRUM is an agile process (3.5), as the approach values interactions and individuals over the use of specific tools, responding to ongoing changes rather than following a plan, and collaboration with customers (both internal and external) over negotiated contracts. Projects are delivered in a highly flexible way, through continuous discussion and review to direct the progress of the work. Implementing SCRUM practices into a traditional manufacturing environment presents challenges in terms of encouraging its adoption by members of management teams and shop floor staff who may be resistant to changing established practices, but the 2020 research (3.2) found that through the gradual introduction of the practices, it is possible to embed the techniques into the ongoing operation of the organisation. Daily stand-up SCRUM meetings, and the planning and regular review of short-term goals (Sprints) enables an iterative approach to improvement of practices. This supports the delivery of operational and organisational change in which all team members are engaged and clear on the objectives of the scheme of work (3.2, 3.5). In the context of a KTP, this enables a more comprehensive and responsive solution to maximising its effectiveness across the term of the partnership (3.2).

### 3. References to the research

The underpinning research for this case study is taken from peer reviewed journals relevant to the field of the case study, as well as papers delivered at prestigious conference events, meaning it can be said to cross the 2\* threshold.

3.1. Bamford.D, Forrester.P, Dehe.B, Leese.R (2015) Partial and Iterative Lean Implementation: Two Case Studies, International Journal of Operations and Production Management, Vol.35, Iss.5, pp.702-727 DOI: [10.1108/IJOPM-07-2013-0329](https://doi.org/10.1108/IJOPM-07-2013-0329)

3.2. Javed, S., Bamford, J. and Abualqumboz, M. (2020) 'Helping Deluxe Beds to sleep easy: A case study of agile project management', The International Journal of Entrepreneurship and Innovation. <https://doi.org/10.1177/1465750320974942>

3.3. Iain Reid, David Bamford & Hossam Ismail (2019) Reconciling engineer-to-order uncertainty by supporting front-end decision-making, International Journal of Production Research, 57:21, 6856-6874, DOI: [10.1080/00207543.2018.1552370](https://doi.org/10.1080/00207543.2018.1552370)

3.4. Bamford, D., Reid, I., Forrester, P., Dehe, B., Bamford, J., Papalexi, M. (2018) Knowledge Transfer and Impact? Presentation at British Academy of Management Conference 2018. Available at: <https://conference.bam.ac.uk/BAM2018/htdocs/search.php?keyword=Knowledge+Transfer+and+Impact%3F>

3.5. I. Reid, H. Ismail, H. Sharifi (2015). A framework for operational agility: How SMEs are evaluating their supply chain integration. In: Managing in a VUCA World. Springer, pp.151-168. [https://doi.org/10.1007/978-3-319-16889-0\\_10](https://doi.org/10.1007/978-3-319-16889-0_10) [can be supplied on request]

#### 4. Details of the impact

Cost reduction whilst maintaining or increasing quality, customer satisfaction and organisational flexibility is seen as being a key strategic economic imperative for survival for any organisation in the current economic climate. This is especially true in the bed manufacturing industry, as they are facing increasing complications with potential threats to the supply chain and potential access to overseas markets associated with Brexit. In the case of Deluxe Beds, a Knowledge Transfer Partnership (KTP) sought to apply academic thinking to the business to overcome or mitigate these threats.

#### Changes to strategic management approaches

For the company involved, one of the major benefits of entering into a KTP is the access to academic research expertise. In the case of Deluxe Beds, the KTP Associate, Dr Sammar Javed, implemented measures described in the research underpinning this case study, which supported the impacts outlined below. The Associate said, "I used my academic research experience to support implementing new approaches to management, including using Lean and SCRUM techniques to provide more structure and direction. Increasing the contact and communication among management staff, while also better engaging the 'factory floor' workers led to a more unified approach to running the business, and an increased ability to react to changes in the business while also planning more effectively for the future" (5.1). These changes provided a solid organisational foundation from which to build the impacts described below.

#### Tangible cost savings

The research and improvements implemented at Deluxe Beds have resulted in tangible cost savings in excess of £1,800,000 in the two years that the KTP project was live. This exceeded the five year post completion target for the project (5.2). Impact was observed almost immediately in the project and was recorded in a weekly log (5.3), which detailed the ongoing progress of the KTP both in terms of the financial benefits, and the actions taken as part of the ongoing work of the KTP associate, Dr Javed. There were multiple work streams taking place at once which resulted in synergies and additional benefits to the operation of the company and its development and growth. The impacts for Deluxe Beds have been significant, and have reached across all areas of the business, improving and changing practices at all levels, from the factory floor, to the strategic management. The KTP Associate on the project states that the measures introduced at Deluxe Beds "helped it to make massive savings, and increase profits across the board" (5.1).

A move which underpinned a large proportion of the impact benefit for Deluxe Beds was a major upgrade to the IT infrastructure in the company. External funding in the form of a Digital Voucher Scheme provided by Leeds City Region Enterprise Partnership (LEP), enabled a significant investment in hardware, software and in-house IT support (5.1, 5.3, 5.4, 5.5, 5.5). Many of the

other cost-based and other benefits have been facilitated by this investment. Indeed, such was its positive effect on the business, it was named one of the Digital Enterprise Top 100 in 2019, and featured as a video case study developed by LEP (5.5, 5.6). The investment has also led to a number of projects looking at digitalisation with collaborators, suppliers and the company's support network, this has provided recurrent savings of £172,200 (5.2, 5.3).

Changes in processes have produced a saving of £484,083 (5.2). Improvement in this area initially focused on streamlining the production process through the implementation of Lean Tools and Techniques. This led to two early impacts. Firstly, through the development of an automated label printing program and procedure for product identification and differentiation, producing savings of £135,000 (5.2); and secondly, through the resolution of IT issues affecting the accuracy of order processing and production schedules, resulting in identified savings of £53,550 (5.2, 5.3, 5.4). Following on from the investigation of the order processing system, it was identified that certain prices were incorrect. This led to a further impact through implementing product pricing correction in the IT system, which automated customer specific prices and definition of price change procedure, resulting in a saving of £182,000 (5.2).

Improvements in production through better operations resulted in savings of £648,227. This was achieved through the secondary effects of the streamlining of production processes described above. The measures resulted in a rationalisation of delivery and production planning procedures, which led to a further saving of £81,600 (5.2).

The IT initiatives described above also led to the development of in-house IT support services which has saved £44,210 to date (5.2). Additionally, an audit of accounting, budgetary and forecasting processes was carried out, and improvements made to management procedures following this has led to savings of £26,000 (5.2, 5.3). This process also identified that the company had no Aged Debt Collection Procedures. These were quickly established and have recovered £66,492 from aged debtors to date (5.2, 5.3).

Improvements in supply chain and supply chain management resulted in savings of £360,729 (5.2). The streamlining of production processes described above included a review of Inventory Management Procedures. This led to the development of stock management, ordering and record procedures to assign individual responsibilities, and the hiring of a Stock Manager. All of this has generated recurrent savings of £75,000 (5.2). The Label Program (also mentioned above), has allowed mattress weight to be visibly displayed on packaging for the first time, and has brought further savings in the factory and warehouse (5.2).

### **Impacts on profits and other revenue**

As part of the development of the IT system, a 'potential customer' database was created. This has directly facilitated the generation £70,500 of sales to date (5.2). As part the IT system upgrade, new technology and procedures have been implemented to allow the receipt of orders via text message, in order to better support disabled customers' needs. This has generated £6,950 of sales since implementation (5.2, 5.7). Deluxe Beds' Sales Director said of the improvements, "This new system was integral to increasing sales, A potential customer database was created, which enabled us to identify new customers, we made our order process easier and more accessible, and we were able to identify new territories in which we could market our products." (5.7). These changes culminated in a total £151,385 increase in sales revenue (5.2). The Sales Director went on to say of the longer term impacts of the new measures, "the KTP has helped to increase sales figures to their highest ever in 2019, and the enhancements and innovations we have made will continue to have benefits in the coming years. We will be able to increase our customer base, receive fulfil orders more quickly and efficiently, and continue to innovate and attract new sales" (5.7). In addition to these enhancements to domestic sales, the digitisation work with the company's network of contacts has resulted in a new sales lead in a previously unexploited sales territory outside of the UK, "new sales leads in Poland have resulted in an initial order worth £13,536.78" (5.7).

The KTP Associate's work over the course of the project resulted in securing "the numerous pots of external funding which were then invested back into the company" (5.1). These totalled £117,283, and support measures including the improvements to the IT infrastructure described above, as well as a range of other initiatives designed to improve operations and business development (5.2). A particular example of this investment was funding from Future Fashion Factory, a Research & Development partnership that provides funding to support innovation in advanced textile technologies. Deluxe Beds received £56,171 (5.2) to invest into the development of a new type of mattress in partnership with the University of Huddersfield. The new product was launched at the Annual Bed Show 2019, and was nominate for the Innovative Product Award (5.6, 5.7).

#### **Increase in profile and recognition**

Mrs Razak has observed that some of the key impacts from the project are not just financial, but are in the increase in recognition that the company has received, saying "won several awards for our business development, and the quality and innovation of our products" (5.5, 5.6). The company was named in the Digital Enterprise Top 100 for 2019, was featured in a Leeds City Region LEP Video Case Study, was a National Bed Federation Innovation Finalist 2019 – 2020, named in The Manufacturer Top 100 Award 2019, and The Oracle Award 2019 (5.6). These awards demonstrate that Deluxe Beds has become an industry leader in terms of its business model and innovation, the impact of which will be significant for some time to come.

#### **5. Sources to corroborate the impact**

5.1 Testimonial from Dr Sammar Javed, Knowledge Transfer Partnership Associate. Detailing her contribution to the project and the impact it made.

5.2. Knowledge Transfer Final Report. Details of the activity during the KTP, and total financial impacts.

5.3. Knowledge Transfer Partnership weekly log reports. Details of the activities undertaken by Dr Javed throughout the KTP project, and the ongoing impacts.

5.4 LMC reports. Further details of how the KTP developed over its life.

5.5 Testimonial from Deluxe Beds Managing Director, Mrs Razak. Describing the KTP and its impacts.

5.6 Information detailing a selection of awards and funding won my Deluxe Beds.

5.7 Testimonial from Deluxe Beds Sales Director, James Appleyard. Detailing the impacts of the KTP on sales.