TITLE: A new lean tool box for knowledge intensive firms: case of UK business school

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Abstract
Purpose – Capturing the lessons from lean manufacturing, this paper will develop a new lean toolbox for Knowledge intensive firms (KIFs) service industry, using some UK-based Business Schools as examples of KIF, with regards to internal stakeholders, in order to provide competitive operations management in a constantly developing market.

Keywords: lean, higher education, knowledge intensive

Introduction

The 21st century has seen a significant increase in the number of service industries adopting new strategic management approaches (Normann, 2000). This comes as a result, in part, of changing government policies and budget cuts, yet an ever demanding customer base (Radnor and Bucci, 2011). Lean philosophy has since been applied to several industries in an attempt to create a more efficient system whilst reducing costs where possible and improving customer value (Ruffa, 2008). Service sectors including healthcare and higher education institutions are amongst the most prominent in existing literature to have applied Lean (Womack and Miller, 2005; Radnor et al, 2011; Emiliani, 2004), but there still remains a need for further exploration into the management strategies.

This paper takes UK-based Nottingham Business School as a case, for an in-depth analysis of its application of Lean. While, researchers often disagree on the nature of Lean, whether it is a culture to be adopted, (Bhasin and Burcher, 2005; Mann, 2010) or more a matter of applying the correct tools and techniques (Bischeno, 2008; Jones et al, 1997), this paper will consider each perspective regarding its position within the Nottingham Business School case study. Higher
Education bodies, as of Universities, can be referred to as knowledge-intensive firms (KIFs) as their primary function is knowledge creation and transfer (Hargreaves, 1999). However it is noted that a dynamic shift over the last few years has seen the needs and expectations of students (and therefore perceived value) rise considerably (Kuh et al, 2005; Gardner and Eng, 2005). Comm and Mathaisel (2003) identified that student requirements from their university now encompass safe residence halls and the latest technology and equipment readily available. This correlates to increasing UK university tuition fees each year (Anon, Browne report, 2010) to accommodate demands, yet circles back to higher fees resulting in higher expectations. In order to satisfy stakeholders within higher education institutions, there is a need for improved strategic management to be able to remain in a competitive position (Freeman, 2010; Gayle et al, 2011).

Evolution of Lean Management from Manufacturing to Service

Lean Origins

With Japanese origins in Toyota automotive manufacturing, the Lean approach encourages an organisation to remove any waste (Japanese: muda) from its processes, where waste is defined as activities that cost resources but do not add value (Womack et al, 1990). Lean was different from existing theories such as Henry Ford’s moving production line and Taylor’s scientific management as it embraced variation within production (Goldratt, 2008; Stratton and Warburton, 2003). Taiichi Ohno (1988) established Lean within Toyota after recognising the need for rigorous improvements in the production system. Toyota coined the terminology just-in-time whereby a product is pulled through the production system by customer demand, resulting in little to zero inventory (Schonberger, 1982; Hall, 1983). Whilst a strong customer focus is a core element of Lean, it that it is crucial to consider the necessity to align and set the operations and resources in a structure that creates flow throughout the system (Grewal, 2008). Womack and Jones (1996) reported that Lean was adapted in the Toyota Production System (TPS) to exploit changing customer demands and technological advances; this is an element particularly relevant to higher education institutions today. With the roots of Lean in the automotive sector, the management strategy rapidly expanded to several manufacturing plants with the application of a variety of Lean tools including Kaizen and Kanban signalling system (Liker, 2004).

Lean Philosophy

Numerous studies have been conducted in order to evaluate whether Lean can be successfully implemented within corporations using tools and techniques established by Ohno and developed by Womack and Jones (Bhasin and Burcher, 2006; Dahlgaard and Dahlgaard-Park, 2006). These studies argue that whilst there is a need to adopt certain tools in order to create a structured pull system, without the correct education and training from executive level down through the organisation, the system will fail. As a result, organisations may see localised improvements only, which is deficient from the overall goal of optimal operational performance throughout the entire system (Hines et al, 2004). Achanga et al (2006) argue that a flexible organisational culture is fundamental to the success of Lean implementation and suggest several critical factors in influencing the outcome of Lean application. Firstly, the authors suggest that is it vital for senior management to offer clear strategic visions whilst embracing productivity improvement.
initiatives at all levels within the organisation. Secondly, they argue that management must be able to operate in a diverse and changing environment whilst maintaining a long-term focus on its goals. Furthermore, the organisation must be financially capable to fund a transition to Lean management including educating staff throughout the institution through training (Achanga et al, 2006). A study by Bhasin (2012) supports this research, through which the author analysed the effectiveness of Lean when considering cultural change and found that unsuccessful Lean introductions are often attributed to the lack of change culture. When it comes to service industry, moreover, change management seems more complex yet essential. Seddon, 2005, therefore, raised this fundamental question of whether it is possible to efficaciously transfer Lean tools, which were created in a manufacturing environment, to a service-specific industry.

Lean Tools and Techniques

Amongst the existing literature lies several texts which identify tools and techniques closely associated with Lean that can be adopted within an organisation. Hines and Rich (1997) and Bischeno (2008) highlighted the importance of value stream mapping before new approaches are applied. These authors defined value stream mapping as solely the processes that added value to the end product or service, providing a more analytical perspective of the processes. Once this has been identified, organisations can proceed to implement Lean tools and techniques in order to better manage these value-adding processes. This method provides a more substantial grounding for Lean application, promoting a higher level of sustainability and success than implementing the tools immediately.

There are numerous tools and techniques that can be applied within organisations as a part of the Lean management approach. Feld (2001) reported several including 5S, Kaizen, Heijunka, Control Charts and A3 problem solving. These techniques are widely used within firms, yet it is often debated how accurately they are used (particularly 5S), which in turn, affects the perceived success of Lean philosophy (Bischeno, 2008). Developing this notion, it is necessary to consider how efficiently Lean ‘tool boxes’ can be applied to KIFs, in particular, UK business schools.

Lean Service

Bischeno and Holweg (2009) expanded on the long-established publications of Schonberger (1982) and Hall (1983), and more recent authors (Womack and Jones, 1997), suggesting that traditional tools are no longer sufficient in the current business environment but there is a need to incorporate other strategic theories. The authors also propose that the key element of Lean, which is particularly relevant in service industries, is that of value. Whilst waste management is also important, a service industry is only prosperous if it continues to meet the requirements of its customers (Porter, 2004). The transition of Lean manufacturing to Lean service, predominantly focuses on its implementation in healthcare on an international scale (Radnor and Walley, 2008). Researchers studying cases from Italy, US and UK, argue that the quality of care received by patients has considerably improved since the application of Lean (DeSouza, 2009; Radnor et al, 2012; Holden, 2011). This suggests that Lean can be transitioned in some form to service industries and encourages KIFs to adopt similar methods and techniques to increase efficiencies.
UK Business School

Radnor and Bucci (2011) identified several UK business schools that have implemented Lean programmes. This paper aims to build upon the existing literature with a more detailed analysis on the tools and techniques applied within one of the reported business schools.

As previously mentioned, value process mapping is a common tool used when initiating Lean philosophy. A report by Radnor and Bucci (2011) acknowledged that all of the UK Business Schools they examined, employ a form of value mapping within its Lean application. Barton and Yazdani (2012) proposed that the difficulty in value mapping concerning KIFs is due to the ‘hidden’ flow of activities in terms of knowledge transfer. Value mapping is defined by Rother and Shook (2003) as the stream of activities (both value added and non-added) taken to pull a product through the system from raw material to customer demand. By adopting value stream mapping, these business schools aim to clearly define and promote the necessary steps to achieve efficient operational performance. With limited academic literature existing concerning lean application in KIFs, it is difficult to provide a balanced analysis of the trends and outcomes. Radnor et al (2006) identified that whilst literature exists claiming that higher education institutions are developing the understanding that continuous improvement is critical in providing an effective service, there is little examination of the approaches undertaken by institutions undergoing these strategic transformations.

Lean in Nottingham Business School: Case Study and Discussion

Nottingham Business School (NBS) implemented a Lean system in 2008 following previous successes in lean application by executive management in the automotive sector. NBS opted to apply Lean as a completely restructured organisation, supporting the notion of Lean as a philosophy. The argument behind this was the belief of the development of a Lean culture was more likely to encourage a sustainable management structure through the engagement of staff at all levels (Barton and Yazdani, 2012). In order to incorporate all employees as well as the student community in process improvements, NBS introduced several interactive boards. Blue Sky Vision was the name given to the visual control board provided for staff which depicts the key performance indicators of NBS over a three year duration (2008-2011), and is broken down into four components:

1. Quality
2. Delivery and volume
3. Income and cost
4. People.

With visible and accessible organisational reviews, there is a greater engagement of staff in the strategic movement. Executive members utilise the board to maintain the current and relevant provision of information. The student interactive boards differ in content, offering information about NBS including enabling visibility of equipment availability throughout the university. Survey feedback from Nottingham Trent University Students’ Union suggests that these boards are not correctly advertised as few realised they exist. The boards are positioned in the Link Lounge – a communal area to meet tutors which was asked for by the student base, however it can be argued that the large visible boards are not convenient or private for student interaction.
Studies have shown that students value technology as a crucial enhancement on their education (Jones, 2002). With access to portable technology increasing in the form of smart phones and tablets, students demand a more easily accessible form of information. For example, there are numerous computer screens throughout the university, providing information on computer availability in each building. This level of visibility has been positively received by the student body, particularly due to the fact that this information is also available via the NBS website, allowing full transparency on mobile devices (see figure 1). Feedback suggests that this level of transparency reduces time wasted in the search for available equipment, allowing students to be more productive with their time. NBS regularly distributes surveys to the student committee in order to ensure the continuous developments align with customer value and demand, allowing the institution to remain competitive with similar organisations. In addition, NBS has recently invested a significant amount of financial means into ensuring more availability of suitable equipment to students. As a result, the National Student Survey (2013) recorded a 90% student satisfaction on business courses at NBS, indicating that the modifications are, on the whole, in line with customer demand.

![Figure 1. Visibility of PC availability throughout NBS](image)

A further tool implemented by NBS is the use of A3 reports. As a trial project, A3s were introduced to students alongside module assignments as a means to assist in organisation and structure. Student feedback offered mixed reviews with some claiming it was added administration work that detracted from the project at hand; on the other hand, others offered that for use in group projects, it allowed the team to communicate project aims and target deadlines. Due to mixed reviews, it is possible that students were not fully educated in how and why to use the A3 reports, and were therefore not fully engaged in the new process improvement tool. This supports the notion that for Lean philosophy to be successfully accepted, it is necessary to incorporate stakeholders at all levels rather than maintain an executive level introduction. Whilst Lean philosophy has been introduced to the staff of all levels at NBS, the students’ awareness may not be fully developed as of yet. The heavy focus NBS places on visibility has not entirely transitioned over to the student body and results in ignorance through lack of understanding and education.
With waste reduction secondary to value within service industries, it could be suggested that business school institutions work towards a more collective agile and Lean system. Christopher (2000) defines a truly agile system as market-sensitive, process integrated and technology efficient. With this in mind, it is possible to argue that in the case of business schools there is a sub-culture concerning agility within the Lean infrastructure due to the lower work-in-progress, and lower waste, setup and cycle times (Mason-Jones and Towill, 1999). In this way a Lean system is quicker, more efficient and ultimately, more agile. In the case of NBS, the business school is market driven in terms of the level of student attraction, and combines process integration and technology efficiency in its improvements in accessibility and visibility. The Lean culture adopted at NBS encourages continuous improvements throughout the business school and provides a platform for stakeholders to make changes, in order to ensure optimal performance in successfully meeting customer demand.

**Conclusion**

Amongst the existing literature, there is a consistent theme that a successful Lean strategy is one that is adopted as an entire culture change (Womack and Jones, 1996; Comm and Mathaisel, 2005; Bhasin and Burcher, 2005). The notion is that by implementing Lean thinking as a culture ensures the full participation of all employees rather than an executive management decision to be followed. Jorgensen et al (2003) reported a desire from executive members to employ new strategic practices using continuous improvement training, yet were rarely willing to instigate the more radical changes required to uncover the root causes. By establishing Lean as a culture, employees are believed to be more enthusiastic and open with new ideas without fearing the outcome, successful or not (Green, 2002). This provides an atmosphere where employee input is a respected contribution to the value stream, which allows the system to continually adapt, and in many cases, create a new set of tools best suited to the organisation. In order to provide a tool box for Lean implementation, the assumption would be that all institutions require the same structure in order to meet the same customer demands. It could be offered that firms want a set of tools and techniques as it is easier and potentially less expensive than an entire cultural overhaul, yet the competitive nature of the current business environment results in the necessity of alternate techniques depending on the organisation’s infrastructure. As reported by Radnor and Bucci (2011), in five UK business schools, each one adopted different techniques within Lean implementation, implying that due to the ever-changing requirements for customer value, there is no set Lean structure which is universally applicable.
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