

Readiness Model for Higher Education

**Literature review**

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## **1.0 Introduction/ background**

The purpose of this report is to provide a Lean Readiness Index Model (LRIM) that can be used by Higher Education (HE) institutions to assess their readiness for Lean implementation.

The government since 1980s has wanted institutions that are cost effective (Lund and Jackson, 2000b). Coincidentally due to the increase in public spending recently it has put all public services under pressure to focus on reducing waste and improving productivity (Radnor and Walley, 2008). Thus the need to be cost effective has never been more important (Jackson, 2001a). As a result UK institutions will be facing “increased pressure to demonstrate efficiency and effectiveness, and above all that we are providing value for money” (Diamond, 2011).

Lean has been hailed as the new methodology for providing a cost effective, efficient, effective, competitive, value for money, waste reducing method (Balzer, 2010) to resolve this matter.

### **1.1 Academic/ Industry Rational**

The literature is scarce when it comes to Lean in HE as it is a relatively new area. However the demand for Lean implementation in HE is rising due to increased competition and increased pressure from governments (Waterbury, 2011). It is important that universities achieve success in Lean otherwise it will be seen as another “flavour of the month” and result in wasted time, effort and frustration however they do not have time for this (Waterbury, 2011; Blazer, 2010). In order to increase their chances of success in Lean there is a need to increase their readiness. Thus in order to achieve this, a LRIM will be created. The importance and need for a readiness index model is vital hence many authors have created them for Small to Medium Enterprises (SME’s) and other businesses (Kumar and Antony, 2010; Czekaj, 2011; Lee, Wong and Yeung, 2011).

From an academic rational point of view this model will be the first of its kind and thus be a great contribution to HE literature. Due to this model being the first of its kind it also demonstrates the uniqueness of this dissertation.

From an industry rational point of view the LRIM will enable universities to become more cost effective and demonstrate “value for money”, thus enabling them to deal with government pressure effectively, however also enabling them to raise their competitiveness.

## 2.0 Literature review

Prior to the development of a LRIM it is vital to gain an understanding of what lean is, Lean in HE, barriers, challenges and benefits of Lean in HE, readiness index models, the readiness factors for Lean as well as self-assessment models and quality awards. This will all contribute to the development of LRIM for HE.

### 2.1 Lean Thinking

According to Hines, Holweg and Rick (2004) lean thinking originated from the shop-floors of Japanese manufacturers and in particular at Toyota Motor Corporation (TMC) (Shingo, 1988; Monden, 1983; Ohno, 1988). Lean thinking was initiated due to the fierce competition and limited resources that came about in the Japanese market. According to Abdulmalek and Rajgopal (2006) when TMC realised that the American car makers were producing at a 10 times higher rate than TMC were, it led TMC to create a “lean manufacturing” system. Lean manufacturing is concerned with minimising or removing waste to maximise value, Vinodh, Arvind and Somanaathan (2010). According to Womack and Jones (1996) lean manufacturing is based on five key principles that in short simply define what the customer value is and then create it in the most efficient manner possible.

Lean is all about identifying and eliminating waste. Thus in order to identify which activities are 100% waste, Monden (1993) suggested categorising activities as follows:

- **Non-Value Adding (NVA):** If something is classified as NVA it means that it is 100% waste and constitutes solely of unnecessary actions that should be eradicated completely, e.g waiting times, double handling, etc
- **Necessary but Non-Value Adding (NNVA):** The action for NNVA is also wasteful however are necessary to enable an operation to be completed, e.g unpacking deliveries, moving from A to B to pick up parts, etc
- **Value-Adding (VA):** This refers to performing tasks whereby manual labour is used to transform raw materials into semi-finished goods, e.g sub assembly of parts, painting body work, etc

Lean continuously mentions removing waste from a process, however what does waste mean? According to Singh and Sharma (2009) waste has been defined as something that can be found in any form, in any place, at any given time, consuming resource time and not enhancing or adding value to goods. According to Russell and Taylor (1999) everything constitutes as waste apart from the resources, materials and space necessary to add value to the product. According to Hines and Rich (1997) waste can be found in 7 forms, also known as Muda:

**Overproduction:** Out of all the different types of waste overproduction is the most dangerous one. This is because overproduction triggers longer storage and lead times. Moreover the goods produced may become obsolete and also cause a buildup of Work in Progress (WIP). Finally overproduction causes other wastes to form as well.

**Waiting:** This refers to when equipment breaks down or slows down thus the employee is subjected to waiting. Or when the employee is waiting to move onto the next process step

**Transport:** Any movement made is classified as a waste thus attempts should be made to minimise them.

**Inappropriate processing:** This is when operations performed on the product are above the customer requirement. By over delivering causes the lead time to increase.

**Unnecessary inventory:** Excess inventory (WIP, raw materials) will trigger longer lead times, higher expenses due to transportation and storage

**Unnecessary movements:** Whilst working any actions such as stretching, bending, leaning over are all unnecessary motions that should be removed as they have a negative impact on the productivity rate.

**Defects:** Any materials that do not meet the customer specification and thus needs rework or have to be thrown away is known as a defect. Defects cause unnecessary handling time.

From here it can be seen how lean was designed to understand and deliver outcomes that best meet the needs of the stakeholders (customers, suppliers, etc) (Emiliani, 2004). Many firms realised that lean thinking presented an opportunity for them to raise their competitiveness. Hence lean has been widely used with manufacturing organisations (Shah and Ward, 2003; Abdulmalek and Rajgopal, 2006; Shah and Ward, 2007). Through the application of lean many businesses experienced: revenue growth; improved customer focus; rise in market share; improvement in the quality of product/service; larger profit margin; to name a few (Emiliani, 2004).

Service sector has also implemented lean and achieved numerous benefits (Marr and Parry, 2004; Parry, 2004; Bhatia and Drew, 2006). With lean demonstrating its power and benefits across two sectors it has resulted in increased pressure on public sector to also improve efficiency through the application of lean (Radnor, Holweg and Waring, 2011)

## 2.2 Public Sector

Public sector consists of organisations that focus on the provision of services as oppose to products (Ramos, Alves and Melo, 2007; Baldry, 1998). These services are personal in nature (Baldry, 1998) and are created to fulfil the society's needs (Boland and Fowler, 2000), needs that the private sector fails to fulfil (Ramos, Alves and Melo, 2007). Organisations such as healthcare, education, police service, central government and local government to name a few all fall within the category of public sector organisations (Radnor and Bucci, 2008; Boland and Fowler, 2000). Figure 1 provides a comprehensive list of the public sector organisations within Scotland along with their size. Together these public sector organisations employ 23.8% of Scotland's population (The Scottish Government, 2012), see Figure 2 and Table 2. Thus indicating how important the public sector is for the economy (Baldry, 1998).

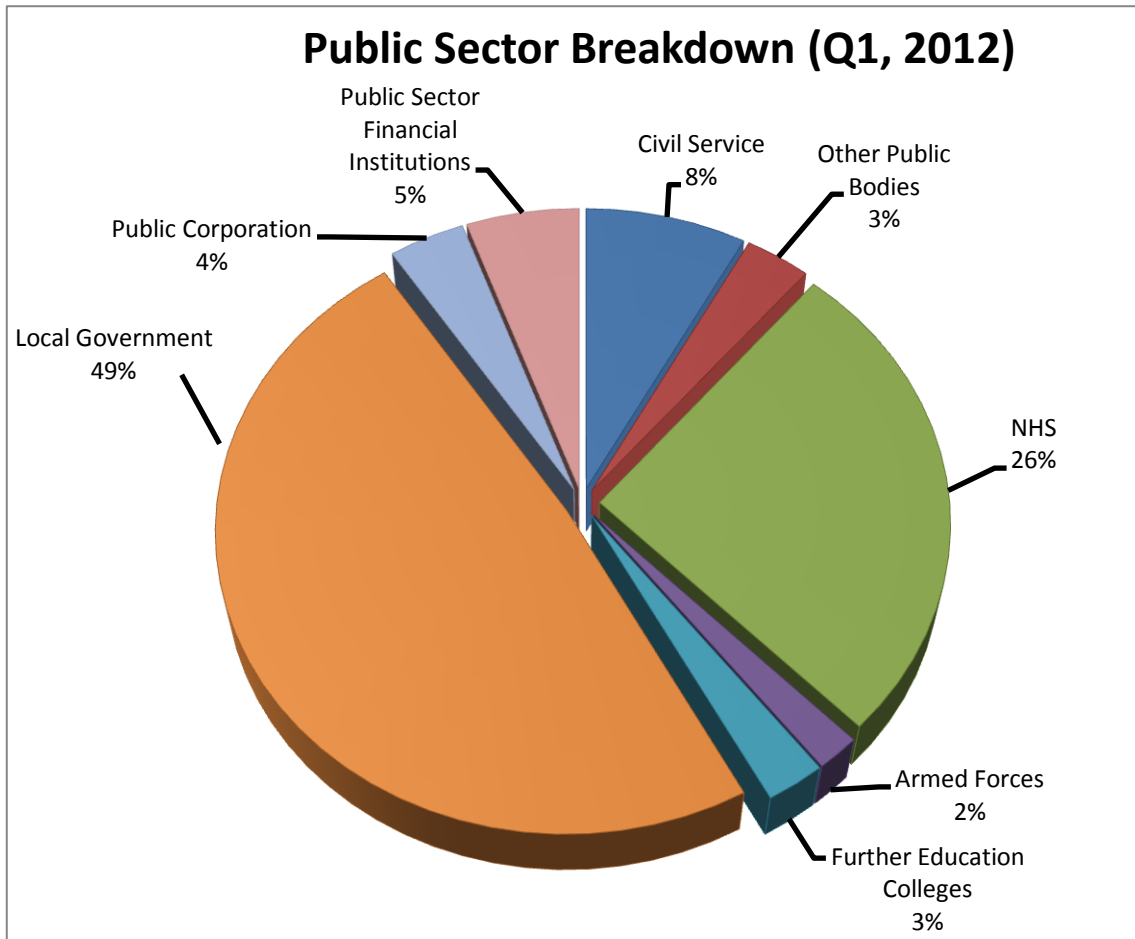


Figure 1 – Public Sector Breakdown Figures Q1, 2012 (adapted from The Scottish Government, 2012)

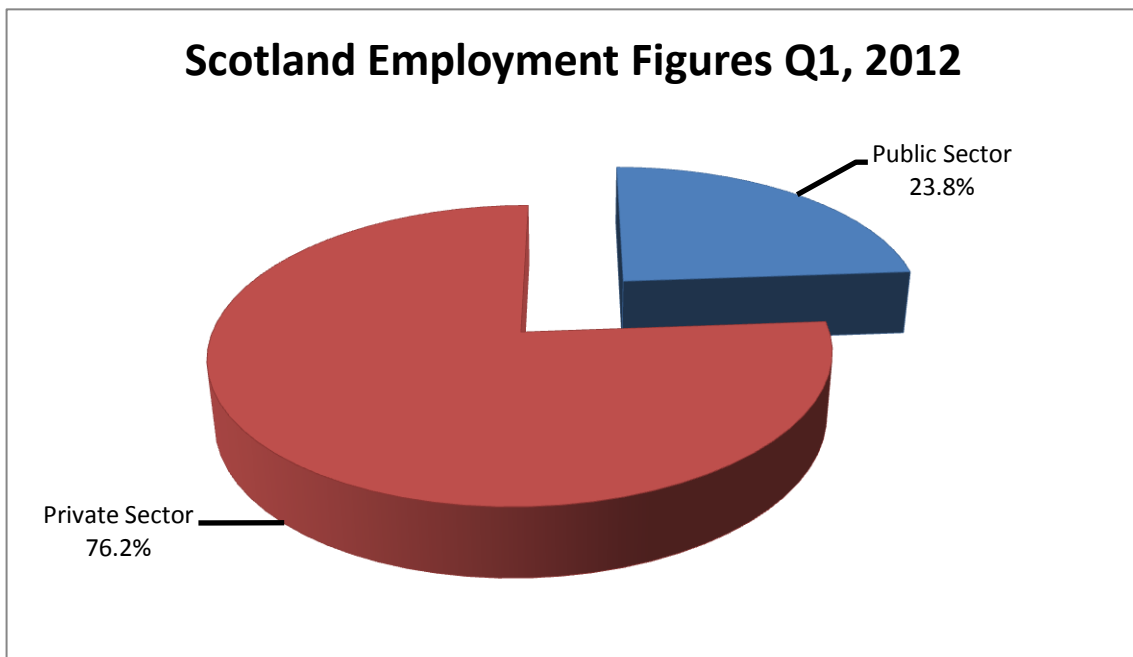


Figure 2 – Scotland Employment Figures Q1, 2012 (adapted from The Scottish Government, 2012)

| Sector       | Employment Figures      |
|--------------|-------------------------|
| Private      | 1,868,200               |
| Public       | 584,800                 |
| <b>Total</b> | <b><u>2,453,000</u></b> |

Table 2 – Scotland Employment Figures Q1, 2012 (adapted from The Scottish Government, 2012)

### 2.2.1 How Lean Started in Public Sector

The government is responsible for the provision of public sector services. As the services are free at the point of consumption, it means they are disconnected from the economy, causing inefficiencies to increase, as a result causing costs and time delays to occur during their delivery (Caranaghan and Bracewell-Milnes (1993) as cited by Baldry (1998)). Moreover as the government has a monopoly when it comes to the provision of these services it means they don't have any competition which is one of the other reasons why these inefficiencies develop (Bhatia and Drew, 2006).

With government spending having increased rapidly as a result it has resulted in the government pressurising public sector organisations to raise their performance by focusing on removing waste and increasing productivity (Radnor and Walley, 2008).

In order to deliver under this pressure of delivering public sector services that are efficient, cost effective and productive (Gershon, 2004; Radnor, Holweg and Waring, 2011; Fryer, Antony and

Douglas, 2010) lean was selected (Waring and Bishop, 2010). Despite lean originating from manufacturing sector it is still applicable within public sector, or in fact in any sector by anyone (Womack, Jones and Roos, 1990). However implementing Lean within the public sector is considered to be a challenging task, however not impossible (Bhatia and Drew, 2006; Radnor, Holweg and Waring, 2011; Radnor and Bucci, 2008).

Since its selection as the ideal methodology for implementation (Radnor and Walley, 2008) it has been utilised to raise the efficiency of healthcare, local government and central government. With progress being made in these areas to achieve value for money the government is now making an attempt to raise the efficiency within HE as well (Holbeche, 2006).

According to Comm and Mathaisel (2005) if lean implementation is not implemented right first time then universities may be unable to implement it again due to financial constraints. Moreover result in employees showing resistance towards it thus making it difficult for it to be implemented again. However with rising government pressure this isn't an option. Hence there is a need to determine which readiness factors are required to increase the chances of success of lean within HE.

## 2.3 Lean in HE

### 2.3.1 What is higher education?

Being a public sector organisation (Jackson and Lund, 2000a) HE focuses on the provision of a service, which is education (Dahlgard and Østergaard, 2000). Despite HE being not-for-profit it still needs to generate enough income per annum to support and reinvest back into the university (Jackson and Lund, 2000a). As according to Kelly (2001) the aim of any organisation, including HE, is to survive first and then thrive. HE is comprised of many functions that come together in order to make the provision of education possible: financial services, IT infrastructure, registry, library, estates, and student services, to name a few (Jackson and Lund, 2000a).

#### History

Around 1963 within the UK there were 26 institutions and 250,000 students. However these numbers, particularly the students studying within universities has increased significantly (Armstrong, 1999). By 1992 students within universities had reached 800,000 (Lund and Jackson, 2000b). There was a need to raise the competitiveness of the British industry and the best means of achieving this was through providing the industry with a workforce that was educated, skilled and trained and university was the best means of achieving this. Hence with governments aid the number of students attending universities rose significantly in response to the British industry needs. However rising number of students led the government public funds per university to seem less. Thus from the beginning the concept of achieving more for less has constantly been encouraged. However this has been a challenge to achieve (Armstrong, 1999). This further signifies the need for the readiness factors for lean in higher education to be determined to ease the process for HE to achieve more for less.



### 2.3.2 Current Situation

The Dearing report once mentioned that HE will continually be under pressure to raise their efficiency and this will only intensify as time progresses (Lund and Jackson, 2000b). The government has wanted institutions that are cost effective since 1980s, with it now being the 21<sup>st</sup> century the pressure has intensified significant, so much so that higher education face a higher percentage of pressures, for instance:

- Students are placing pressure on HE now as they have developed more of a consumer mindset (Waterbury, 2011) hence expecting more than just the provision of a good quality education (Comm and Mathaisel, 2005)
- The government is now placing pressure on HE to raise their efficiency and effectiveness in order to reduce public spending
- The government believes that between 2004 and 2020 there will be a potential of 18 million jobs. Out of which 50% will be graduate jobs. However in order to achieve that target they need institutions that can cater for more students whilst using the same amount of resources. Thus enabling the country to achieve maximum economic productivity by 2020 as highlighted in the Leitch Review of Skills report (House of Commons, 2007). Hence resulting in more pressure on HE.
- The government exerts further pressure by expecting institutions to raise efficiency whilst having access to diminishing resources and declining funding (Varey, 1993; Lund and Jackson, 2000b).

In order to deal with this pressure effectively institutions need to demonstrate value for money. According to Kelly (2001) this can be achieved if focus is placed on improving and examining the right organisational processes (Varey, 1993). As, currently focus is not placed on processes that add value to HE's customers (Dahlgard and Østergaard, 2000). As a result high levels of waste can be found in those institutions, mainly as they are not following the principles of lean, which focuses on adding value and removing waste (Dahlgard and Østergaard, 2000).

According to Womack, Jones and Roos (1990) lean enables activities to be completed so efficiently and effectively that time and effort utilisation are significant reduced, which provides one with a competitive advantage, which is highly important for HE institutions (Jackson and Lund, 2000a). Considering HE institutions are facing increasing levels of pressure and diminishing resources, lean provides a great means of dealing with it.

However unless the readiness factors are understood and acquired then HE will not be able to implement lean successfully. As a result the benefits of lean will be short lived as well as their ability to deliver to government, students and parents' expectations.

### 2.3.3 What are the benefits of lean in higher education?

The benefits of Lean in HE if implemented correctly are substantial. Some of the universities that have implemented lean have reported/ projected benefits such as reduction in non-value adding activities, cost savings, reduction in duplication of tasks, to name a few. A more comprehensive list of the benefits can be found in **Table 2**.

|        |                    | Description   | Benefits   |
|--------|--------------------|---|--|
| Author | Emiliani (2004)    | <ul style="list-style-type: none"> <li>Lean is applied to the design and delivery of a leadership module</li> </ul>   | <ul style="list-style-type: none"> <li>Increased satisfaction with the course.</li> <li>Demonstrated through increase in teaching and course excellence ranking.</li> </ul>  |
|        | Doman (2011)       | <ul style="list-style-type: none"> <li>Application of lean to administrative processes.</li> <li>Administrative process that was being improved was the grade change process of undergraduate/ post graduate course</li> <li>63% of the undergraduate grade change process was non- value adding and 90% of the graduate grade change process was non-value add</li> </ul>  | <ul style="list-style-type: none"> <li>Potential solutions show both grade change process can be completed in 5 steps as oppose to 59 steps combined.</li> </ul>   |
|        | Waterbury (2011)   | <ul style="list-style-type: none"> <li>1000 hours per annum of HR personnel's time was consumed in searching, waiting and re-submitting of employee contract forms.</li> <li>Moreover employees were lost to other institutions due to the universities inability to sign contracts with employees immediately.</li> <li>Hence through the utilisation of lean forms were simplified and contracts were handled electronically as oppose to on paper</li> <li>Hence Simplifying forms and moving from paper to electronic based management of contracts. This significantly reduced the amount of time spent in waiting, searching and resubmitting forms.</li> </ul> | <ul style="list-style-type: none"> <li>The amount of time spent in waiting, searching and resubmitting forms is significantly reduced</li> <li>Contacts are processed in a matter of weeks now as oppose to months</li> </ul>                                      |
|        | Waterbury, (2011,) | <ul style="list-style-type: none"> <li>The process of data gathering and analysis for accreditation purposes was highly inefficient. As three administrative staff were spending 62 working days duplicating and searching for data and report creation.</li> <li>Application of lean encouraged the use of a central database and use of standard coding procedure.</li> </ul>   | <ul style="list-style-type: none"> <li>Significant reduction in duplication of work</li> <li>The undergraduate admission and tracking process reduced by 98%</li> <li>Administrative staff able to spend their time doing more value adding activities.</li> </ul> |
|        | Diamond (2011)     | <ul style="list-style-type: none"> <li>Application of lean in Finance, Library, Registry and Estates areas</li> </ul>   | <ul style="list-style-type: none"> <li>Job vacancies are advertised at a shorter notice, thus enabling</li> </ul>  |

|  |  |  |  |
|--|--|--|--|
|  |  |  | <p>£150,000 saving to be achieved</p> <ul style="list-style-type: none"> <li>• Turnaround time for student status letters has reduced significantly. Letters are available instantly on demand as oppose to having to wait between 5-10 days</li> <li>• Books within the library are shelved within a period of 4 hours as oppose to taking 21-210 hours.</li> <li>• Reduction in traveling back and forth from the estates department by enabling estates staff to conduct their work from any computer on campus.</li> </ul> |
|--|--|--|--|

Table 2: Benefits of lean application within HE

### 2.3.4 What are the Barriers and challenges facing lean in HE?

Within HE there are many barriers and challenges that face them when it comes to the implementation of quality improvement models. As lean is also a quality improvement model these challenges are also applicable to it (Waterbury, 2011):

#### 2.3.4.1 Language barrier

Within HE the term customer is not commonly used (Waterbury, 2011; Radnor and Bucci, 2008) and as a result staff are uncomfortable with its utilisation (Hines and Lethbridge, 2008). Lean focuses on removing tasks that do not add value to the customer, however if staff can't see who the customer is, then confusion and frustration are normal reactions. According to Emiliani (2004) who is the customer? It can be the student whom is attending the classes, yet it could also be the employer that is paying the tuition fees. However Hines and Lethbridge (2008) believe that to bring staff in terms with the concept of customer, staff can be informed of customers that are present at different levels.

#### 2.3.4.2 Financial Resources

Another barrier is limited financial resources available to hire external consultants to educate university personnel on Lean principles (Waterbury, 2011). However Waterbury (2011) believes that this barrier can be overcome through good leadership. Leaders can look into using hidden resources such as staff and students whom have an understanding of lean principles to assist in implementing lean. Whilst teaching staff can be used to train administrative staff, students can be used to analyse data. Thus overcoming this barrier to lean.

#### ***2.3.4.3 Non-Existence of Reward Systems***

Due to the limited budget universities have it means they cannot set aside a certain percentage for rewards. However when a change program is being initiated it is important to ensure that the employees adjusted behaviour sticks. According to Kotter (1996) the best means of doing this is through rewards as employees can see the employer approves of their new behaviour. However as financial rewards are not possible in universities Waterbury (2011) believes that this barrier can be overcome by giving recognition to employees through newsletters, gift packs or providing a service that can be given by the university i.e getting a free massage from massage classes. In essence Waterbury (2011) states the importance of creativity in selecting rewards for staff in universities who perform well in lean initiatives.

#### ***2.3.4.4 Lack of Quality Metrics***

In order to measure the effectiveness of Lean initiatives there is a need to have the correct metrics in place, metrics that can measure improvements: such as increased customers satisfaction, improved capacity and lower costs, to name a few. However according to Waterbury (2011) universities only have metrics in place to measure enrolment, retention rates and student to faculty ratios, to name a few. The culture in HE does not naturally fall into the category of data collection for Lean specifically as a result lack of quality metrics acts as a barrier to lean implementation.

#### ***2.3.4.5 Time commitment***

Training, developing a new style of thinking and making decision are all timely activities however a requirement for lean. University staff, whose time is spent in carrying out their normal day-to-day tasks, find it difficult to devote his level of time towards lean. As a result when too much of their time is consumed in solving problems through lean principles staff tend to revert to their pre-lean ways of solving problems. With lean absorbing staff time it results in them either having to invest extra hours to cope with the work load or alternatively fall behind on their work (Waterbury, 2011). This happens initially, however in the long run it helps simplify these employees' jobs, to make them more manageable (Balzer, 2010).

#### ***2.3.4.6 Lack of Quality Knowledge***

If employees are not aware of how lean ties into their day to day jobs and how it benefits the students they will not be willing to take on extra work load for a given time frame. Hence in order to overcome this there is a need to educate and train the employees on lean principles (Waterbury, 2011).

All in all these are the barriers that face HE. If organisational readiness is to be achieved then the barriers for lean need to be considered as well (Radnor and Bucci, 2008). However the barriers can be easily overcome by implementing the solutions that have been provided with each of the barriers.

Another reason why understanding and surmounting the barriers of lean is important as failure to do so can result in the adoption of lean in HE to be slowed down. This was experience in healthcare as well (De Souza and Pidd, 2011).

### **2.4 Self Assessment and Quality award**

The purpose of self assessment model is that it gives the organisation the opportunity to compare their current situation against "a position of excellence" (Kaye and Anderson, 1999).

Self assessment models such as business excellence and Malcolm Baldrige National Quality Award can only be used by organisations that have already embarked on Continuous Improvement, hence they cannot be used by beginners (Kumar and Antony, 2010; Kaye and Anderson, 1999). Malcolm Baldrige National Quality Award has been used by universities in the past to improve their performance on important success factors (Waterbury, 2011).

In essence self assessment models provide universities as a way of improving performance. Thus if they want to improve performance on lean then a self assessment model needs to be developed. However as lean in higher education is a new topic the literature available in this area is scant. As a result, this demonstrates that there is a need for a readiness index model, a self assessment model, that can be used to assess current performance against a position of excellence. The position of excellence would be generated in the form of readiness factors which would be derived from literature and verified from universities that have been involved in lean. The beauty of the self assessment model will be that it will enable preparedness for lean to be measured which past models for CI have not been able to do, as they have only been able to be used after CI implementation (Kumar and Antony, 2010; Kaye and Anderson, 1999).

## **2.5 Readiness Factors**

According to Radnor, Walley, Stephens and Bucci (2006) despite readiness factors being of utmost importance they have been given little attention in literature. As a result meaning it is an underdeveloped area, hence proving the need for this dissertation to be conducted in this area, to fill the gap.

There are certain enabling conditions that need to be in place before an organisation decides to embark on the lean journey (Grove, *et al.*, 2010). Readiness factors determine if the organisation is prepared to be involved with or can permit lean to take place (Radnor, 2010). Thus if a university is to ensure that it is seen to be ready to embark on lean then it needs to ensure that its "soil" is equipped to approve and support the initiation of lean (Balzer, 2010). In essence if these readiness factors for lean are not achieved then employees are likely to revert to their old ways of doing things and as a result, causing the lean initiative to not be sustained and fall through (Radnor and Bucci, 2008). Moreover failure to achieve the correct "readiness" factors will create resistance from everyone when an attempt is made to implement lean (Balzer, 2010).

According to Oakland and Tanner, (2007) past experience on change programs, like six sigma, have highlighted that the readiness part is not well comprehended or developed. As a result many organisations spend a lot of time going round in circles in the lower half of the model in Figure 3. The top circle provides strategic alignment to the change initiative which is important (Oakland and Tanner, 2007).

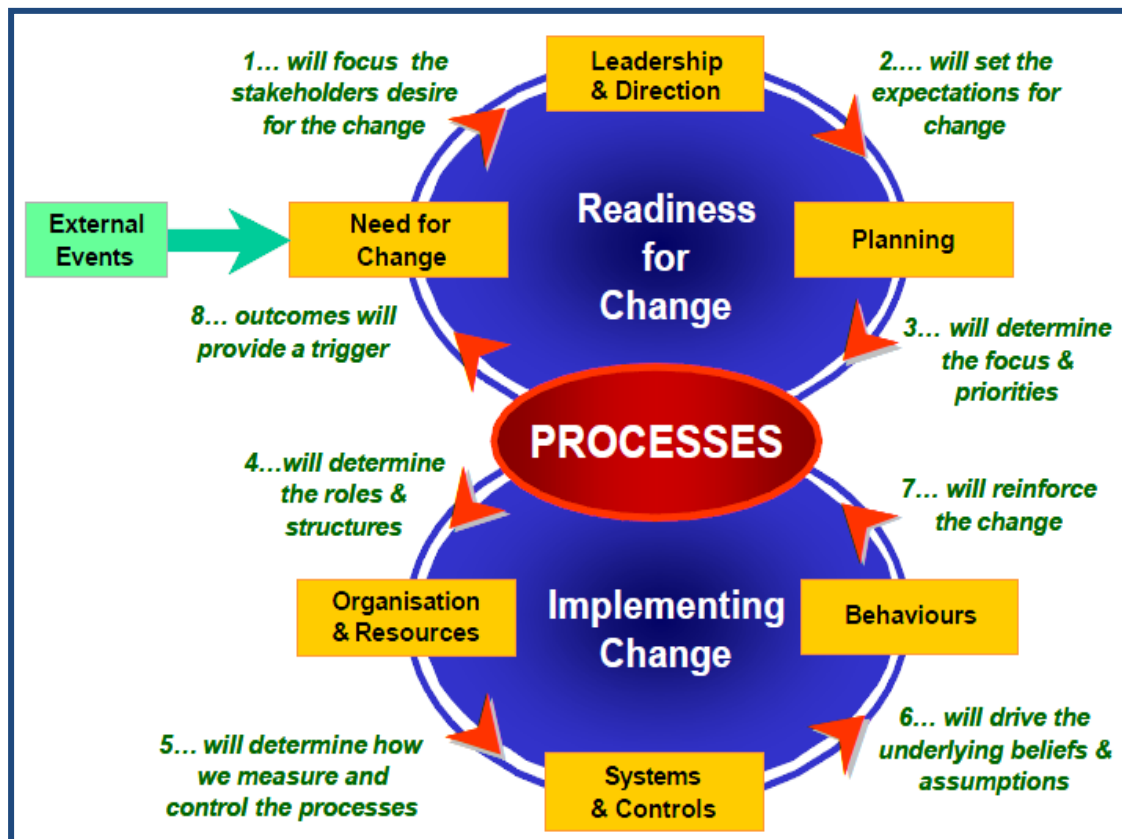


Figure 3 – The Organisational Change Framework – Adapted from Oakland and Tanner (2007)

Lean is also a change program (Balzer, 2010) thus from here it can be seen how important determining the readiness factors for HE is, as without which many universities will also be spending majority of their time in the lower circle in Figure 3.

In line with the previous thought Radnor and Bucci (2011) also state that many organisations focus directly on the utilisation of lean tools when they embark on lean. However the success resulting from this approach will be short term, focus initially needs to be placed on readiness factors as they enable long term success to be achieved, in essence create a sustainable initiative This thought is further strengthened by Radnor and Walley (2008) who state that after the low hanging fruits have been achieved the journey of lean becomes harder and only those that have embedded the readiness factors are able to complete the lean marathon, i.e achieve real benefits of lean. In essence become those institutions that are able to effectively meet the challenge set by the government – demonstrating effectiveness, efficiency and value for money (Diamond, 2011).

Kumar and Antony (2010) used Critical Success Factors (C.S.F) as one of their methods to determine their readiness factors; hence a similar approach will be used for this dissertation. The C.S.F will be generated from literature and the appropriate C.S.F as readiness factor will be selected based on survey findings. This will enable the second objectives to be achieved.

Due to literature on HE being highly limited (Waterbury, 2011) the researcher decided to generate the C.S.F from public sector organisations. As HE itself is a public sector organisation it means this approach and reasoning behind this is valid. The literature review has highlighted 20 factors that are vital for the implementation of lean in the public sector (see Table 3). It becomes apparent that the most popular C.S.F are:

- Leadership, Communication,
- Management Commitment and Support,
- Organisational Culture and
- Company-wide Commitment (see Figure 4)

Though the survey will highlight the most appropriate readiness factors for HE.

|                                 |   | Journal Source                  |                         |                             |                          |                           |                             |                          |                          |                            |                                     | <u>Total</u> |                          |
|---------------------------------|---|---------------------------------|-------------------------|-----------------------------|--------------------------|---------------------------|-----------------------------|--------------------------|--------------------------|----------------------------|-------------------------------------|--------------|--------------------------|
|                                 |   | Dahlgaard and Østergaard (2000) | Radnor and Bucci (2011) | Radnor <i>et al.</i> (2006) | De Souza and Pidd (2011) | Comm and Mathaisel (2005) | Antony <i>et al.</i> (2012) | Radnor and Boaden (2008) | Radnor and Walley (2008) | Grove <i>et al.</i> (2010) | Proudlove, Moxham and Boaden (2008) |              | Lodge and Bamford (2008) |
| <b>Critical Success Factors</b> | 1. Leadership   | X                               | X                       | X                           |                          | X                         | X                           | X                        |                          | X                          |                                     |              | 7                        |
|                                 | 2. Communication  |                                 | X                       | X                           |                          | X                         | X                           |                          |                          | X                          |                                     | X            | 6                        |
|                                 | 3. Management Commitment and Support                    |                                 | X                       | X                           | X                        |                           | X                           | X                        |                          | X                          |                                     |              | 6                        |
|                                 | 4. Training and Education                               |                                 | X                       |                             | X                        | X                         |                             |                          | X                        |                            |                                     |              | 4                        |
|                                 | 5. Linking Lean to Business Strategy                    |                                 | X                       | X                           |                          |                           |                             |                          | X                        |                            | X                                   |              | 4                        |
|                                 | 6. Organisational Structure                             | X                               |                         | X                           |                          | X                         |                             |                          |                          |                            |                                     |              | 3                        |
|                                 | 7. Resources (Time, Budget, External Consultant)        |                                 | X                       | X                           |                          | X                         |                             |                          |                          | X                          |                                     |              | 4                        |
|                                 | 8. Organisational Culture                               |                                 | X                       | X                           | X                        | X                         | X                           |                          | X                        |                            |                                     |              | 6                        |
|                                 | 9. Systems Thinking                                     |                                 |                         | X                           |                          |                           |                             | X                        | X                        |                            |                                     |              | 3                        |
|                                 | 10. Urgency/ Need for Lean                              |                                 | X                       | X                           |                          |                           |                             |                          |                          |                            |                                     | X            | 3                        |
|                                 | 11. Vision  |                                 | X                       |                             |                          |                           |                             |                          |                          | X                          |                                     |              | 2                        |
|                                 | 12. Employee Empowerment                                |                                 |                         |                             |                          | X                         |                             |                          |                          |                            |                                     |              | 1                        |
|                                 | 13. Company-wide Commitment                             |                                 | X                       | X                           |                          |                           |                             | X                        | X                        | X                          |                                     |              | 5                        |
|                                 | 14. Right Project Selection                             |                                 | X                       |                             |                          |                           |                             | X                        |                          |                            |                                     |              | 2                        |
|                                 | 15. Selecting the Right People                          |                                 | X                       |                             |                          |                           |                             |                          |                          |                            |                                     |              | 1                        |
|                                 | 16. Measurement Metrics                                 |                                 | X                       | X                           | X                        | X                         |                             |                          |                          |                            |                                     |              | 4                        |
|                                 | 17. Customer Focus/ Understanding customer Requirements |                                 |                         | X                           |                          |                           |                             | X                        |                          |                            |                                     |              | 2                        |
|                                 | 18. Capacity for Improvement                            |                                 | X                       | X                           |                          |                           |                             | X                        |                          |                            |                                     |              | 3                        |
|                                 | 19. Having a Dedicated Lean Team                        |                                 | X                       |                             |                          |                           |                             |                          |                          |                            |                                     |              | 1                        |
|                                 | 20. Teamwork  |                                 |                         | X                           |                          |                           |                             |                          |                          |                            |                                     |              | 1                        |

TABLE 3: C.S.F FOR LEAN IN PUBLIC SECTOR



## C.S.F for Lean in Public Sector

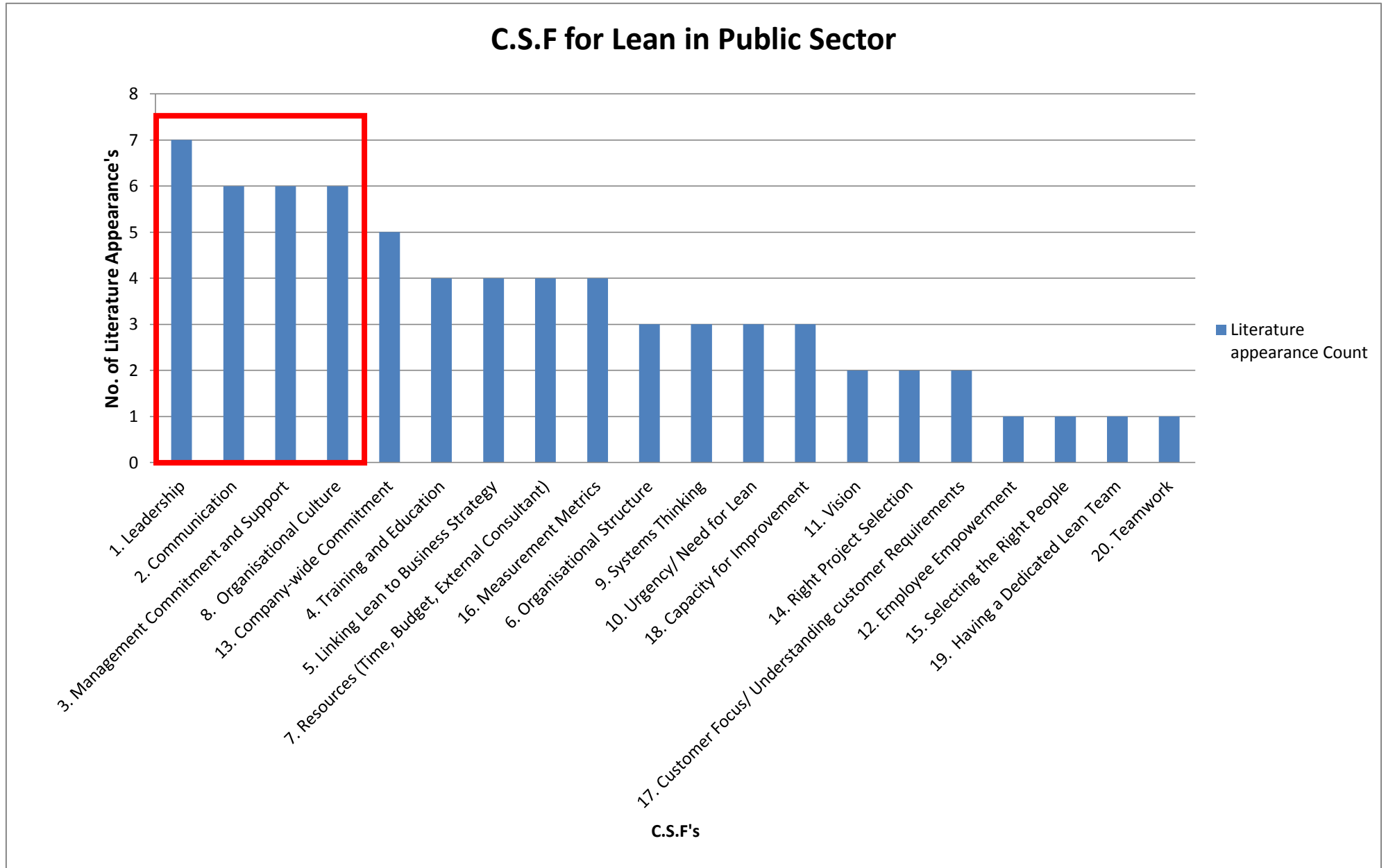


FIGURE 4 – C.S.F APPEARANCE IN LITERATURE

In the next section the LRIM will be explored, the model that will incorporate the Lean readiness factors.

## 2.6 LRIM (Lean Readiness Index Model)

As highlighted earlier many organisations that embark on a change program are unaware of readiness factors, hence they end up focusing on aspects that will reduce their chances of success in lean (Oakland and Tanner, 2007). This in turn can also result in the initiative to fail. Moreover, even worse result in people having a perception that lean is not applicable within higher education (Radnor, Walley, Stephens, and Bucci, 2006). This is something higher education cannot afford right now as they are being put under a lot of pressure to deliver.

According to Lee, Wong and Yeung (2011) a readiness index model makes the organisation aware of its weaknesses, strengths, appropriateness and readiness to embark on an initiative like lean. For this reason it is considered to be a highly useful and beneficial model. The readiness index model will inform the institution of which area (lean readiness factor) needs to be further enhanced, (Lee, Wong and Yeung, 2011) which would enable a smooth implementation of the lean initiative. This is what higher education institutions need, a model that will focus their attention on what matters, thus allowing them to meet government expectations.

However the literature when it comes to lean in higher education is limited. There are only 2 books, 3 journals, 1 report that have been published on the topic. The available literature highlights that the readiness factors most applicable for higher education in the UK are unknown (Emiliani, 2004; Doman, 2011; Comm and Mathaisel, 2005; Waterbury, 2011; Blazer, 2010; Radnor and Bucci, 2011). Moreover a LRIM does not exist. With the current situation hinting at the need for a LRIM and combined with the lack of literature available in this area it justifies the need for this dissertation to fill the gap.

The notion of determining an organisations readiness to embark on an initiative through a readiness index model has been explored by many authors.

- For instance Kumar and Antony (2010) created the six sigma readiness index model for SME's. The model was focused on

### ***“The extent of SMEs preparedness for the introduction of six sigma”***

The authors understood that SME's have limited skill set and resources. Moreover failure to implement six sigma successfully can result in the SME going out of business or discourage them from embarking on six sigma again.

- Czekaj (2011) also understood the dilemma SMEs had with embarking on change initiatives. Thus this author created the same readiness index model as Kumar and Antony (2010), however focus was placed on Lean instead. In essence a Lean Readiness Index Model was created for SMEs that focused on:

### ***Measuring SMEs preparedness for introducing Lean initiative***

- A six sigma readiness self-assessment model was also created by Lee, Wong and Yeung (2011) specifically for Chinese enterprises. The model focused on:

***“Determining the readiness of China enterprises to implement the Six Sigma approach”***

What becomes apparent from these models is that many authors realise that implementing a change initiative for the first time is a daunting experience and many things can go wrong. Hence a readiness model is crucial, and it is developed in order to minimise any difficulties that can be experienced in the implementation of the initiative. This is exactly what the LRIM for higher education hopes to achieve.

In light of keeping the purpose of readiness index models in mind it can be said the purpose of LRIM for HE is to:

***“Determine the readiness of higher education on embarking on lean”***

**How the Readiness Index Model Functions**

Self-assessment models (mentioned in section 2.4) provide a way of improving performance but they do not provide insight on how to “do the things you do well better”. As mentioned by Balzer (2010) readiness factors have different levels to them. Depending on which level of readiness you have will dictate your preparedness for lean and determine your success at it. This is effectively depicted in Table 4 where it can be seen how different levels of preparedness in the readiness factors (leadership and workplace climate) will determine the scope and potential of the lean initiative.

|  |                             | <i>Lean Higher Education Leadership Practices</i> |   |   |
|--|-----------------------------|---|---|---|
|  |                             | Consistently Low Support                          | Variable Support                                      | Consistently High Support                             |
| <i>Lean Higher Education Workplace Climate</i> | Consistently Non-Supportive | Abandon   | Defer   | Fix: Change climate then re-assess                    |
|  | Variable Support            | Defer   | Readiness for Lean Initiative at a <u>Local Level</u> | Readiness for Lean Initiative at a <u>Local Level</u> |
|  | Consistently Supportive     | Fix: Change leaders then re-assess                | Readiness for Lean Initiative at a <u>Local Level</u> | Readiness for <u>University Wide</u> Lean Initiative  |

**TABLE 4: READINESS FOR LEAN IN AMERICAN HIGHER EDUCATION INSTITUTIONS (LEADERSHIP PRACTICES AND WORKPLACE CLIMATE) – ADAPTED FROM BLAZER (2010)**

The readiness index model acknowledges that readiness factors have different levels to them and thus incorporates it in its design (Kumar and Antony, 2010; Lee, Wong and Yeung, 2011; Czekaj, 2011). A 5point likert scale can be found in the models where the respondent can mark their level of readiness for each of the readiness factors variables. Thus enabling universities to determine which lean readiness level they are on and inform them of what needs to be done to increase their readiness. If the rank total for each readiness factor was equal to or greater than 3 then the organisations is ready to embark on the initiative. The more prepared they are the higher success they will achieve in making lean successful and sustaining it.

Moreover the beauty of the LRIM is that it complies with HE self-assessment model requirements as highlighted in **Table 5**:

| HE Self-Assessment Model Requirement Criteria |  |   |
|---|--|---|
| Model Name                                    | Enables improvements, developments, or changes to take | Meets and satisfies expectations for accountability |
| LRIM  | ✓  | ✓   |

TABLE 5: LRIM COMPLIES WITH HE SELF-ASSESSMENT MODEL REQUIREMENTS (ADAPTED FROM KELLS, 1992; 1995; JACKSON, 1997B; AS CITED BY JACKSON AND LUND, 2000A)

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