1 Introduction

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I'd like to do some improvement work, but I'm always too busy.

If this sounds familiar to you, then you are the person for whom this book has been written. Continually displacing what is important for what is urgent is endemic amongst western managers. We call it the 'fire-fighting syndrome', because we have an image of a manager with a fire hose who spends his time fending off the problems of the day. The trouble is, of course, if we never make time for what we know to be important, we may not have a business tomorrow!

This book addresses the messy subject of lean implementation. If you are involved in business improvement and have figured out that it is one thing to find out what to do but another to actually do it, then this book has been written with you in mind.

Let us address the meaning of lean first of all. If you are familiar with the car industry or even the manufacturing sector more widely, then you may have come across the term. The term 'lean', coined by a group of academics, concerns the ability of the Toyota Motor Corporation to achieve outstanding manufacturing performance levels in Japan. They wanted a word to capture what they saw – a system without 'fat'. By fat we really mean waste and we'll come back to that later on. Toyota's manufacturing operations are impressive in many ways, but the distinguishing characteristic that these guys noted was that Toyota was able to do a lot more with a lot less. In other words, with a lot less resources (inputs), they are able to produce a lot more (outputs). Their productivity (measured in terms of headcount and unit output) was *double* that of equivalent firms in the west. And that productivity performance was not at the expense of quality either. In fact, their quality performance (however you cared to measure it) was dramatically higher than their western counterparts (in the order of 20 times). So the phrase *lean production* was born. The academics involved documented their findings in a book, *The Machine that Changed the World*, which was published in the early 1990s. The book was hugely popular and, in 1992, was voted business book of the year. Over a decade on, many industrialists are still keen to take the 'lean' ideas and use them within their own organisations. For lots of them, understanding these ideas is simple enough (many are about getting the company back to basics and

good old commonsense). However, translating and applying the ideas is a different matter. Knowing what to do is the easy bit, doing it is rather harder. This book is about doing it.

The main purpose of this opening chapter is to capture your attention and make sure that, having read this introduction, you are inspired to read on. This introduction, then, aims to inform you of why this book has been written and for whom it is intended. By the time you have finished, you will have decided whether it is worth your while reading further or not.

Who should read this book?

This book is targeted mainly for business improvement managers or managers with some other similar titles. Improvement may be every manager's dream – to be able to step back from the day-to-day drudgery of operations and dream of slicker and more streamlined processes sounds fantastic. Improvement can, however, be a double-edged sword. Depending on the culture prevalent within the organisation, being handed the job of improvement can be a poisoned chalice. However, business improvement for most presents a unique and gratifying challenge.

After all, every company is trying to improve itself in some way or another. Some are caught in the 'fire-fighter syndrome' trap; others have seen dramatic improvements already and want to know where to go next. Wherever you are on the improvement road, if you are involved in the manufacturing sector, this book has been written with you in mind. If you happen to be involved in car manufacturing, much of the terminology and many of the concepts that will be addressed in this book may be familiar. Nevertheless, you will still find this book to be something of a departure from many of the others and here's why.

Our unique selling proposition (USP), as we like to call it in business, or the thing that differentiates this from other books available on the market, is that it tackles improvement implementation. Implementation is messy and cloudy and, for that reason, most authors leave it well alone or make reference to it only in passing. Consequently, amongst the current improvement/lean literature, the practitioner really only has two types of book available to him: the management guru texts (such as *The Machine or Lean Thinking*) or toolkit books (such as *The Lean Toolbox*). The guru texts are a good overview, but lack the detail you would need to apply the concepts. The toolbox books are great reference documents, but give the impression that familiarity with an array of tools and techniques is the only armour you need to transform your business. In our opinion, what is missing amongst the lean literature is a text that has been written with the user, the business improvement manager, in mind. This book aims to address that gap.

So how do we address the issue of lean implementation?

If you have decided by now that you do roughly fit within the target audience, you will be eager to know how we intend to tackle the difficult issue of lean implementation. Essentially this book has been produced as the end result of a three-year research programme. The research programme is entitled Learn 2 – a simple play on words. All the companies involved were all *learning* to (Learn 2) be *lean*. The next section offers the reader some background and context to the programme.

The Learn 2 programme

The programme was an idea that sprang from a group of researchers working at the Lean Enterprise Research Centre (LERC). LERC is a research centre based at Cardiff Business School. Details about LERC and what goes on there can be obtained by looking at our website.[1] The centre was built upon the work of Professor Dan Jones, co-author of *The Machine that Changed the World* (1990), the text within which the term 'lean' was coined. The Centre carries out leading-edge research into the application of the lean concept in different environments (particularly outside the automotive sector, the original home of lean). LERC research staff have considerable cumulative knowledge about the implementation of the lean concept but have never formally collaborated on the issue of lean implementation. Consequently, the Learn 2 programme, as devised by Dr Nick Rich,[2] was a significant departure from the traditional research programmes conducted within LERC.

Learn 2 is a small network of manufacturing companies, from a range of different sectors. They were joined together in a network for no other reason than they were all engaged in making their organisations lean or leaner and were seeking help with lean implementation.

The programme was launched in May 1999. Prospective companies were gathered together and told that their needs would best be served by participation in the Learn 2 network. In order to take part, companies would have to pay with a nominal fee to fund the university research programme and this fee provided them with an amount of 'support capacity' from designated LERC 'mentoring' research staff. The details of how they used that capacity would be worked out with each company individually, based on their needs, wants, histories, etc. The programme would enable them to tap into the cumulative implementation knowledge that resides within LERC and, as such, this latent knowledge represents the main benefit companies would receive

[1] www.cardiff.ac.uk/carbs/lerc
[2] Dr Nick Rich is now a Director of Cardiff University's EPSRC Innovative Manufacturing Research Centre.

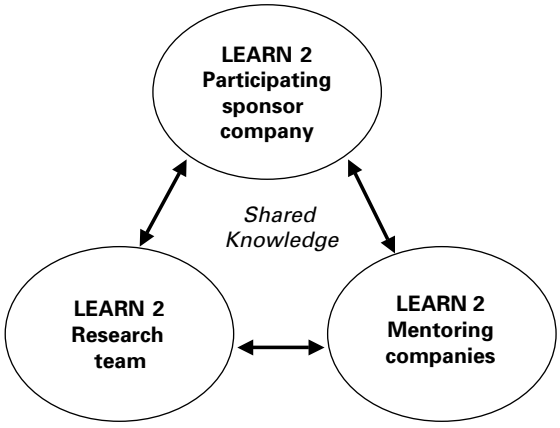

Figure 1.1 Knowledge flows within the Learn 2 network

from participation in the programme. It is important to note that, although companies were signed up in spirit for the duration of the programme (i.e. three years), they were entitled to leave earlier. If, for example, after the first year they felt they were not getting good 'value for money' by their participation in the programme, they could withdraw.

So, access to LERC expertise is the main benefit participating companies would receive, but not the only one. Learn 2 companies were encouraged to participate in the 'networking' aspect of the programme as well. Each company assigned someone to perform the role of main contact with LERC and to act as internal programme coordinator. We refer to these individuals as lean change agents. They would meet on a quarterly basis to exchange ideas and share information on progress. Other representatives from participating companies might be invited along to the meetings, but the core individuals would remain unchanged from meeting to meeting. The 'networking' aspect of the Learn 2 programme has proved to be very powerful for a variety of reasons and is further explored later in the book.

From LERC's perspective, the value of Learn 2 lay in the interchange of ideas among those members of research staff who were assigned to the project (the LERC Learn 2 research team). The programme provided a unique opportunity to study a collection of disparate organisations, united only by their common objective to implement lean. The Learn 2 network therefore offered the LERC Learn 2 team a chance to observe and reflect on what seems to work well and why.

The Learn 2 network is wider than the participating companies and, in total, includes: the LERC Learn 2 research team, the Learn 2 participating companies and three mentor companies. These mentor companies are ones with whom LERC has had an ongoing relationship for many years and who have themselves been through the turmoil of lean implementation. Their participation in the programme is informal and they are used to provide support and encouragement. The main information and knowledge flows within the network are shown in figure 1.1.

The Learn 2 participating companies

For reasons of confidentiality we have not revealed the identity of the actual companies that took part in the programme. Our view is that any company trying to improve itself should be commended; after all change is never easy. However, improvement always and inherently involves criticism of what went on before. That is the nature of the beast. In our experience, there are few commercial organisations that like to 'wash their dirty linen in public' and, in order not to compromise our findings, we have decided to 'anonymise' the participating companies and to disguise them in other ways. A brief profile of participating companies follows.

Heavy Products

Heavy Products is a manufacturing site, part of an international group, engaged in the production of large metal-based products. The company employs over 500 'long-serving' people. The motivation to begin the journey to lean implementation was stimulated by increasing competition from overseas manufacturers and falling market prices for this 'commodity' type of product. The manufacturing facility may be classified as 'low volume and high variety' with an increasing specialisation on the finishing of products which can be sold as 'higher value added'. It is probably fair to say that this company was facing a serious crisis.

Cosmetic

Cosmetic is a manufacturer of high fashion products, many with short lifecycles, for retail businesses and has a huge and growing product range. The business employs around 550 full-time employees and an additional contingent of temporary labour to meet their highly seasonal demand. The business, recently acquired and added to an international group, was motivated to engage in lean production as a means of improving the performance of the firm and to generate the profits necessary to fund the expansion of the group. The culture of this highly unionised factory is a healthy bias towards learning and involvement of the workforce, but is also characterised by cautious apprehension at the management level in applying 'lean' to such a 'high-variety' environment. The business works to many different customer standards and the factory has a high priority on 'good manufacturing practices' (GMP) to ensure the process of conversion is controlled to the highest standards.

Health Products

The growth rate of Health Products has been phenomenal, based upon high customer demand, but the market for these products has attracted a number of competitors

from countries with low-cost labour. The resultant pressure for 'cost performance' has highlighted the importance of factory productivity and the senior management of the business, heavily committed to 'world class' manufacturing and growth, have selected the lean approach as most appropriate for their business needs. The process of conversion is complex and highly technical, engaging almost 2,500 workers at multiple sites, to service a common warehouse, which, in turn, services the world market. The business is dominated by sales to Japan, the most demanding product market in the world, and is regulated by the Food and Drugs Administration.

Air Repair

Air Repair is a long-established business, making and repairing complicated and critical systems for aerospace and aeronautical customers. Employees at the site are very experienced, unionised and technically skilled in working with high-precision and computerised manufacturing technology. The business is an independent manufacturer, supplying final assemblies of the finished product and again is classified as a 'high-variety and low-volume' business, which is heavily regulated by external awarding bodies. The business also has a complicated supply chain and was motivated to 'lean' by the need to control complex product flows and to improve its customer service by compressing lead-times and reducing arrears.

Medical Devices

Medical Devices' products has grown from a cottage-style industry of laboratory operations to large-scale production. This transition has caused a number of problems for the highly educated workforce, and automation has brought with it major issues concerning product and process control. The business, owned by a multinational corporation, was experiencing major operational difficulties, causing a great deal of stress and tension within the business. The business employs around 400 employees to produce a growing range of product families, in high volumes, to customers located throughout the world. The site is heavily regulated by the Food and Drugs Administration.

Mornington Cereals

Mornington Cereals make breakfast cereals and are a profitable organisation within a highly successful group. At the start of their lean journey, however, the company were experiencing considerable competitive pressures from within their own group, in particular the European sister companies, and they were also recovering from the unsettling effects of shutting down part of the factory and having to reorganise staffing levels. They decided to embark on their lean journey in order to combat these competitive

pressures and consolidate new staffing structures. Mornington Cereals manufacture breakfast cereal from a range of wet and dry ingredients. The product is made through a process of mixing, extrusion, drying and packing. The final packaged product is made available to the consumer in a range of forms from single portion pouches (30g) to 1.5 Kg boxes.

It is clear that the Learn 2 network embraces a highly diverse range of companies, each of which has its own story, motivations and prevailing conditions shaping the nature of their lean implementation. However, the commitment and enthusiasm of each company, primarily at the outset, was pervasive.

The mentor companies participating in the programme included:

1 A major retailer who has turned the fortunes around in the last 40 years or so and who now leads the way within their own, highly competitive market.
2 A retailer of electrical and electronic components who has cornered a significant proportion of their market through their unique customer service offering.
3 A large-volume automotive company that has been forced to find innovative ways to survive the last few decades in this highly volatile and fiercely competitive sector.

In summary then, and in answer to the question posed at the start of this section – how do we address the difficult and messy issue of lean implementation – we adopt a 'systems' approach. In our observations of all companies participating in the programme, we take an holistic view. We frequently ask: does the system or subsystem (whether it be the order fulfilment system or the new product development system) work? Is it predictable and can abnormalities be easily detected and addressed? These questions constitute the essential ingredients for the success of Toyota's production system, the archetypal lean manufacturer. Our conclusions, however, are in no way prescriptive. We begin from the premise that lean implementation will always be contingent upon the set of circumstances impinging on the organisation at any given time.

How this book has been structured

A brief explanation of how this book has been structured is worthy of mention at this point to save the reader potentially wasting valuable time. As mentioned before, the book has been written with the industrial practitioner in mind. For that reason we have tried to give a cohesive logic to the structure, without making the chapters overly interdependent. In other words, the book can and really should be read from beginning to end to produce a cumulative message; however, at the same time, each chapter can be read on a stand-alone basis as well. Therefore, if you are interested in visual management or preventative maintenance, but do not have the time to read the entire text, then you can simply dip into the relevant chapter and use the book as a reference

text. The undesirable by-product of designing the book in this way is inevitably a certain amount of repetition. We have endeavoured to keep this to a minimum and also to signpost and cross-reference as much as possible.

The book has been broken into four main parts:

The first part includes Chapters 1–3. Collectively these chapters provide the reader with a certain amount of contextual knowledge, thereby sensitising the reader for what follows in later parts. Chapter 2 is entitled 'Understanding the lean journey' and explains the background, rationale and logic of lean. While we do have a model to describe lean implementation, the detail of lean implementation is as varied as the companies that took part in the Learn 2 programme. This chapter explains why this is the case and, in doing so, explains why a prescriptive approach to lean implementation would be both inappropriate and misguided. Whilst this text inevitably offers advice on what to do and why, it is never intended to be dogmatic and dictatorial. Management intuition should not be undervalued in determining what is and what is not likely to work in any given organisation. We *always* take notice of it when we are facilitating companies. The final chapter of this part, entitled 'Understanding your organisation' encourages the reader to carefully consider the set of conditions surrounding his or her own particular organisation by comparing them with stereotypes. The issues discussed in this chapter should help the reader focus his or her thoughts on a number of important aspects, such as the relative likelihood of success or failure of lean implementation within their organisation, the most appropriate starting place and the likely pace of change. In the first part, therefore, we guide the reader from the general to the more specific in preparation for the more detailed discussion in the parts that follow.

Chapters 4 and 5 sit together and form the likely starting place for many lean implementation initiatives. Indeed most, though not all, of the Learn 2 companies started here with varying degrees of success and difficulty. The reason for the popularity of CANDO (see Chapter 4), leading to visual management and performance measures (chapter 5) as the focus for the first year of a lean implementation initiative, is not that this is always the right starting place, rather that, for many organisations, lean is the 'baby' of a handful of enlightened individuals within the organisation and therefore company-wide buy-in is often a dominant problem and force for inertia. Although, we do not advocate a prescriptive solution for lean implementation, CANDO and visual management can be particularly powerful ways of achieving this buy-in and of mobilising the enthusiasm and energy of others, many of whom will become important actors in the later stages of lean implementation. The benefits of CANDO and visual management (VM) are precisely that they are visual and that they have a direct and positive impact on those that matter most, the people who touch the product. Management love it too because their factory is transformed, in a very short space of time, into something much

more inviting for customers to visit. Operators love it because it makes their working lives and conditions better and easier and they instantly perceive lean as something that involves them. Consequently these two chapters are full of the learning points that were pulled together as a result of the collective experiences of the companies participating in the programme. Many improvement initiatives begin with a whole raft of information-finding activities, leading to lots of meetings but little actual change. In lean we are always careful to avoid 'paralysis by analysis'!

In the fourth part, chapters 6–8 together form the crux of lean and address what we refer to as the three pillars of lean: total quality management, the Toyota production system (pull and just-in-time) and total preventative maintenance. Our position is that any company seeking to become truly lean will have to master all three pillars (as Toyota has done), though not necessarily all at the same time or in the same way. Our Learn 2 companies embarked on a three-year programme to initiate an organisational transformation. Toyota, for example, began the transformation process over half a century ago and is still engaged in perfecting the system. Also, it would be unrealistic and unhelpful to limit our discussion in these chapters to the Learn 2 companies alone. Consequently to illustrate and enhance our discussion, we draw on our wider knowledge and experience of lean implementation.

In the final section, which includes chapters 9–11, we largely come back to the Learn 2 companies as the primary sources of our deliberations. In chapter 9 we address the important issue of sustainability. How to maintain and evolve the change programme is a real issue for many organisations who may have started their programme some time ago. Here we explore the issue by explaining some of our own research into this issue. The research findings culminate into a series of enablers and inhibitors which, when practitioners are made aware of them, can help to shape and improve their own chances of success. In chapter 10, entitled 'group learning', we deliberate on some of our own lessons as a result of the Learn 2 programme. Many of us were struck by the power of collective learning. The feeling of support that comes from being part of a like-minded group is not dissimilar to being part of a family. We believe, though we cannot prove, that one or two of the participating companies may have abandoned their lean journey during certain points of crisis if it had not been for this support. Finally in this part, we attempt to synthesise our thoughts in a closing chapter entitled 'Conclusions and future challenges'. Here we weave together many of the issues raised in the preceeding parts of the book. We reflect on where we are, where we have come from and begin to consider issues that will be important for the future.

Finally, it should be noted that each chapter includes a diagram designed to guide the reader to other relevant and related information. Also, each chapter ends with signposts and recommended readings. Here we suggest a selection of what we believe to be the very best from the raft of literature that is out there.

That completes the primary purpose of this opening chapter. Hopefully you have read enough to want to read on. At the outset it is important to remember that improvement is about dynamic change and therefore those involved will inevitably experience periods of highs and lows. Within the Learn 2 programme, we saw the initial excitement and flurry of activity give way to lethargy and disenchantment in the second year. We hope that this book offers practitioners a guiding light to remind them that, although the journey is not an easy one, where we are going to is far superior to where we have come from. The third year witnessed the true integration of management with the lean initiative and the strategic integration of all business processes rather than just those close to the point of production. The problems of the second year resulted from a natural point in the improvement process, where the production teams cannot progress further because they are constrained by traditional practices and inhibiting behaviours in the management and support departments. Year three is the point where management begin to set direction and reduce demarcation between operations and support functions.