# Lean Implementation in a Painter/Decorator Micro Enterprise: A Case Study

Stuart Nelson and Olivia McDermott(✉)

University of Galway, Galway, Ireland
Olivia.McDermott@universityofgalway.ie

**Abstract.** This research demonstrates how Lean can be applied in a Microenterprise. Utilising a case study in a painter/decorator business, the study aims to show the benefits of applying Lean in a service organisation. The study also investigates how the Enterprise Ireland Lean program benefited the microenterprise case study. The results demonstrated that by utilising Lean tools, a new customer quotation process was designed with reduced the non-value add time to raise a customer quote. An enhanced online quotation process ensured a level-loaded, more value-added process. The study is the first published study of Lean in a painter/decorator and can be leveraged by similar size micro-enterprises to demonstrate the applicability of Lean. For academics and practitioners and informing government funding policy, this study demonstrates that Lean can successfully be deployed in Micro Enterprises. This study demonstrates that government support can aid Lean and enhance economic competitiveness. Further research opportunities are to compare and contrast Lean deployment in other sectors across the microenterprise space.

**Keywords:** Micro Enterprise · Lean · Enterprise Ireland · Lean for Micro · Painter · Decorator

## 1 Introduction

Organisations must strive to improve profits and increase their customer base in an increasingly globally competitive world. Micro Enterprises (ME) is defined as one with between 1 and 10 employees and less than 2 million annual turnover [1]. In Ireland, there are over 250,000 micro- enterprises employing just over 400,000 people [2]. The West of Ireland, in particular, have 20% of Irish gross industrial output for Irish-owned enterprises, with just under 14000 employees employed in the SME sectors [3]. Many Micro-Enterprises rely on self-employment and operations as their only source of income, and given the level of competition from large-scale industrial outfits, most MEs are finding it difficult to compete in terms of quality or price [4].

Lean is a proven method of reducing operating costs and removing waste from operations. Lean deployment has become common in many sectors, including manufacturing [5, 6], service sectors such as healthcare [7–10], public sector organisations [11], medical devices [12, 13], and pharmaceutical [14, 15] industries. However, these aforementioned


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sectors are typically larger enterprises and small and medium-sized organisations. The Irish government has supported all Irish businesses in recent years through the Irish Department of Enterprise. Funding and grants, as well as training courses with access to Lean consultants, have been provided to help train, mentor and implement Lean management[16]. This support has provided productivity improvements, Sales increases, improved product and service quality and increased employment across all sized enterprise sectors [17]. However, the impact of Lean on MEs is unknown, as are the specific challenges this Micro Enterprise size faces. Furthermore, limited literature exists on Lean applications in MEs globally and in Ireland [18–21]. This study explores a research gap and carries out a more in-depth analysis of the challenges and benefits of Lean deployment in MEs.

A case study around Lean deployment within a painter decorator ME in Ireland who participated in the Irish government Enterprise Ireland Lean program will be the main focus of this study. This study will provide detailed insight into Lean deployment within a single Irish ME to ascertain the challenges and benefits encountered. The main research questions that will be addressed are:

1. What are the reasons for and challenges to implementing Lean in the case study ME?
2. What are the main Lean tools and techniques used by the case study ME?
3. What benefits and results did the case study ME experience after using Lean tools and techniques?

The remainder of this paper is arranged further into five sections. Section 2 discusses a literature review of Lean and its applications and deployment in MEs. Section 3 presents the methods adopted in the study. The research findings and analysis based on the case study are presented in Sect. 4. Finally, the discussion and interpretation of the results are examined in Sect. 5, while the conclusions are presented in Sect. 6.

## 2 Literature Review

Lean mainly originated in LE's, and deployment of Lean initiatives has been more focused on LE's and then SME's rather than in micro organisations [19]. ME's vary in resources and capabilities in relation to SME's [22]. The owner of a micro-enterprise can be a manager driving the business as well as the delivery driver or someone who packs the delivery trucks [23]. MEs have been described as owner-managers [24]. Therefore the Leader/manager has much more of a hands-on role in Lean deployment than in other organisations. While there are many benefits to Lean deployment, smaller organisations such as MEs need government supports with Lean fundingtraining [25]. Irish enterprises are unique globally in that the state assists and recognise the competitive benefit of Lean and funds its implementation [21, 26, 27].

Lack of personnel, training and cultural issues are considered the biggest roadblocks to implementing Lean [5, 14]. However, these challenges are compounded in smaller organisations with fewer resources, such as ME's. Nelson et al. [21] highlighted that Lean deployment in ME is often resisted due to resource issues, time for training and time to implement Lean, but it was found that the Lean changes once made aided consensus, teamwork and workforce engagement. Nelson et al. [21] also found that MEs

have a high proportion of owner-managers and thus can influence Lean adoption more expediently and successfully in their businesses. Therefore, SMEs' importance to the business infrastructure is greater than may be obvious at first glance [48]. Adopting Lean implementation in smaller enterprises is prescribed as starting with basic tools such as 5S, Kaizen and visual layouts and then deploying more sophisticated tools. Research conducted by Hu et al. [27] found that the most used tools by SMEs are the simplest and cheapest ones, such as value-stream mapping, 5S, Kanban and total productive maintenance [27]. There are many CSFs for Lean implementation for which leadership and management involvement and commitment are critical to the success of the lean program [28]. The CSFs of Lean deployment within SMEs include culture, financial resources, appropriate Lean expertise and training, and leadership commitment are important CSF's aspects for an SME to take into consideration when deploying Lean successfully [19]. ME's can often be due to their "micro" nature and lack of the necessary resources and culture to deploy these initiatives [29].

Through Enterprise Ireland (EI), Ireland has been supporting Irish enterprises with Lean introduction for several years. As a result, they set up a Lean for Micro Enterprises initiative in 2015. This initiative aimed to introduce ME's in Ireland to Lean concepts. The initiative's aim was that these ME's would garner an understanding of Lean and that the Lean tools and techniques could benefit process improvements, cost reduction, productivity improvements and, ultimately, competitiveness [29]. Since its inception, the Lean for Micro programme run through Irish Local Enterprise Offices (LEO's) has had over 800 companies have benefited from its expertise and principles [17].

## 3 Methodology

The case study methodology was applied because it enables more insight and understanding of the phenomenon under investigation [32]. Also, the case study approach allows for answers to the "how" and "why" questions of the research, as well as the recognition of the unique contextual circumstances [33].

A case study approach was used, and within that, Lean methods deployment. The painter/decorator ME business was started by its owner during a recession due to a dramatic slowdown in the construction industry in 2009. The owner grew the ME business from a one-person crew to a team of 10, amassing a vast range of painting and decorating skills and experience. Based in Ireland, the ME provides bespoke, premium painting and decorating services in the East of Ireland. The business offers several services, including free colour consultation by a professional designer with all interior work.

Along with hand painting and spray painting, the business carries out preparation work, such as Power Washing. They are also skilled in wallpaper hanging, hand-painting and spray-painting of kitchen units, floor sanding and lacquering. Quality control checks are carried out during and upon completion of all painting and decorating contracts, ensuring that the business and customer are satisfied with the work.

Building a professional operation in the painting industry is challenging due to competing with other businesses with fewer overheads, offering inferior services or products, or even operating on a cash basis. Thus the business is always seeking ways to improve business by reducing costs, ensuring a pipeline of work exists, and making

the business profitable and sustainable. To this end, they sought to develop business skills by availing of any support and training they could access. Thus the business joined the "Lean for Micro" program run by their Local Enterprise Office (LEO). As a result, the case study ME was able to avail of the training and mentoring services offered by their LEO. The Lean program structured 2 days of training in Lean Thinking & Tools, followed by 5 × ½ days in company support.

During the Lean workshops, the ME owner realised that the problems in the business were not necessarily on the painting side of the business but on the planning and administration side. The business kept detailed spreadsheets covering all aspects of operations, including scheduling, leads, and scheduled jobs pipeline. During the first individual Lean coaching session, the Lean coach reviewed the level of detail and data that was being captured. Waste in terms of value add and Non- Value add waste was discussed and analysed. Problems in the current system were the time spent capturing and generating the data and spreadsheets, the level of detail, manual duplication, and the value of the data captured was analysed and mapped. Another, more urgent issue in the business was the time spent managing the sales process from inquiry to win or loss of the sale, and this was decided to be the focus of the first lean project.


**Fig. 1.** Current sales process

## 4 Results

Firstly a process map was carried out of the sales inquiry and customer quotation process. Next, a non-value add waste analysis (NVA) using the 8 wastes of Lean was carried out. The ME organisation's sales process started with a customer enquiry, typically through a social media channel (Fig. 1). These enquiries usually arrived in the evening with customers scrolling through social media and messaging to look for a quote. The ME owner would engage with the customer through chat/text and arrange a visit to measure. The ME owner would travel to the customer, measure, return home, prepare the quote, email to a client, and then follow up. Most of the quotation work took place outside office hours and the owners working day. The first step was to document and measure the process; each quote, including discussion, travel, measure and preparation, took, on average, 3 h.

There was a steady pipeline of enquiries, and on average, 12 quotes per week were generated with a success of win rate of 41.5%. The ME found that while the quote process was time-consuming, it generated work 41.5% of the time and kept the business profitable. However, there was still the fact that 58.5% of that time was nonvalue added work, and that approx. 17.5 h per week was used on non-value added and non-profitable work. In terms of Lean thinking, lost quotes were waste and needed to be addressed.

A root cause analysis was carried out regarding the ME's quotes that did not proceed and translate into orders. The top 2 reasons for quotes not going ahead were customers

stating that the costs were too high and that they were not ready to have the work done. Upon discussing with lost customers why the cost was off-putting, customers stated that they did not think it would be so expensive to hire a painter/decorator compared to painting themselves. In terms of not being ready to take up the quote, customers cited the decision to get a quote as premature and stated they might come back on a future day. Thus based on the customer information, a brainstorming session to reduce the non-value add waste in relation to the quote process was discussed. The concept of BANT was introduced as a model for sales. BANT is an acronym for "Budget Authority, Need, Timing" [30] to establish the requirement by the customer for the painting job before committing to a resource-heavy site visit and a fixed visit quotation to improve the win rate.

A quote calculator was proposed to build an estimate from measurements provided by the customer. A quotation calculator or template was created, allowing a review of the services to be delivered; the room measurements could be added, along with a count of windows, doors, sills and radiators (Table 1). Now, everyone who enquired was requested to provide basic room measurements and the number of doors. Once provided, they would be entered into the calculator, and an estimate was provided to the customer. If the client was happy with the estimate, a visit was scheduled to measure and a fixed price quote.

**Table 1.** Quotation calculator template

| Area | Selling Price (inc VAT) | Material used (L) | Cost Per L | Material Cost | Hours | Time Cost | Unit |
|---|---|---|---|---|---|---|---|
| Ceiling (2 Coats) | € 13.14 | 0.25 | € 2.50 | € 0.63 | 0.33 | € 7.10 | Metre Sq |
| Walls (2 coats) | € 16.76 | 0.25 | € 11.00 | € 2.75 | 0.33 | € 7.10 | Metre Sq |
| Single Doors (2 Coats) | € 91.94 | 1 | € 11.00 | € 11.00 | 2 | € 43.00 | Unit |
| Double Doors (2 Coats) | € 183.87 | 2 | € 11.00 | € 22.00 | 4 | € 86.00 | Unit |
| Single Doorframes (2 Coats) | € 91.94 | 1 | € 11.00 | € 11.00 | 2 | € 43.00 | Unit |
| Double Doorframe (2 Coats) | € 113.98 | 1.2 | € 11.00 | € 13.20 | 2.5 | € 53.75 | Unit |
| Skirting (2 Coats) | € 14.20 | 0.25 | € 11.00 | € 2.75 | 0.26 | € 5.59 | Linear Metre |
| Single Window Boards (2 Coats) | € 27.67 | 0.5 | € 11.00 | € 5.50 | 0.5 | € 10.75 | Unit |
| Double Window Boards (2 Coats) | € 55.33 | 1 | € 11.00 | € 11.00 | 1 | € 21.50 | Unit |
| Radiators (2 Coats) | € 18.73 | 1 | € 11.00 | € 11.00 | 0.5 | | Unit |
| Sundries | € 17.03 | 1 | € 10.00 | € 10.00 | | | Unit |

There were 3 advantages immediately from this improvement. Firstly the ability to provide almost instant estimates based on customer measurements eliminates waiting, transport and over-processing wastes. Secondly, by establishing their budget, customers have a very good guide price on the service and can decide whether it is for them. Thirdly many people never responded when measurements were requested from them, establishing, in many cases, the absence of Need & Timing on the customer side.

The final quote was presented in a format that could be completed with accurate measurements, the clients' details, special notes and photos. This was linked to the costing table in Table 1 above and gave the ME owner the ability to provide an instant quotation while still on site. This had multiple benefits, 1. Reduced time to generate a quote, 2. The client receives information immediately, 3. Decision makers are usually present during the quote visit. Thus non-value add waste was reduced. Moreover, a more streamlined level loading or Hejunka process was introduced.

The new process map is as follows in Fig. 2:


**Fig. 2.** New process for quotation with non-value add waste elimination and reduction

The overall improvements as a result of the new process for quotation are shown in Table 2.

**Table 2.** Process changes before and after lean deployment

| Process Step | Change | % improvement |
|---|---|---|
| Quote generation | Reduced from 2 h to 30 min | 75% |
| Quote sending | Reduced from next-day send to instant Send | 100% |
| Win rate | Increased from 43% to 83% | 48% |
| Time spent on quoting | Reduced from 30 h to 12 h per Week | 60% |

Based on the new qualification process - providing an estimated price before measuring and quoting- the number of leads going to quote decreased, but the win rate doubled, eliminating most of the waste. In addition, a pattern of "Click" was identified where people with no real intention to buy were eliminated from leads. As a result, the time to generate the quote was reduced significantly, and the time spent on quoting was reduced by 60%. This allowed the owner to concentrate on other value add work.

The "Estimator/Calculator" was integrated into a new website allowing clients to build their own quotes. The client portal was also developed to allow customers to add or remove options from the fixed price quote. Future projects will focus on 5S in the painter decorator vans, the offsite spraying process, and the set-up and breakdown of work on sites. In addition, the creation of the estimator tool has allowed other team members to be upskilled in the quotation and business development. Thus the owner has more time to focus further on growing the business.

Lastly, the owner stated, "*Lean has helped the business solve problems we know we had, but also many more we did not know existed. Usually, these hidden problems were explained by 'that is the way we have always done it!"*.

## 5 Discussion

The study demonstrated why a ME would deploy Lean to make a business more completive and efficient by removing nonvalue add waste. In particular, this case study demonstrated the amount of time spent on administration as non-value add work in the ME (RQ1). The challenge to deploying the Lean methods was taking the time to analyse the process and available data (RQ1). As found in similar studies on Lean deployment in

ME's lean can improve productivity and reduce non-value add activities, but resources to spend on the Lean initiative can be prohibitive to the success of Lean [20, 21]. In addition, many authors cite a challenge in Lean deployment with the lack of management commitment, particularly at the senior management level [27]. However, this case study aligned with the findings of Nelson et al. [21], where they studied the application of Lean in Irish ME's and found that ME's were more conducive to supporting Lean initiatives due to the owner-manager involvement and this active involvement promoted Lean success.

Simple Lean tools were deployed to initiate Lean in the ME, such as NVA waste analysis, process flow, Hejunka, brainstorming and root cause analysis (RQ2). Generally, the literature on Lean in ME's has observed that simple basic tools are utilised to start the Lean deployment in smaller organisations [12, 21]. Several benefits and results were observed in the case study organisation due to Lean deployment, such as increased order quotation response time, less administration by the ME owner in creating the quote and an overall reduction and elimination of non-value add waste (RQ3). This aligned with the Irish Enterprise Ireland's findings that their "Lean for Micro" program enhanced competitiveness and efficiencies in the ME's that participated in their program [16, 20].

The micro nature of the ME, with a small number of employees and owner involvement, aids in achieving consensus and engagement more expediently and enables rapid improvements. However, government support was instrumental in aiding and providing support and structure to the ME organisations [31].

## 6 Conclusion

The study is one of the first in-depth case studies looking at the experiences of Lean deployment in a ME. The study looked at several areas, including benefits, challenges, and types of tools utilised under the lens of government-sponsored and supported lean for the micro initiative. The authors argue that this study adds to the state of the art, can be utilised as a benchmark, and can inform further government policy and investment. In this study, the ME mentoring approach aided by an Enterprise Ireland consultant was instrumental to the success of the Lean deployment as it introduced Lean principles and translated it into action-based projects with clear linkages to the ME's strategy.

The practical implications of this research are that it provides evidence that Lean can be deployed successfully in ME's and identifies the importance of government support and mentorship, and this can aid ME's who are considering whether to embark on a Lean journey. From a theoretical implications aspect, this is one of the very few studies on Lean deployment in ME's at this level of case study analysis. The research emphasises the importance and success of government-aided support structures for Lean deployment and their role in improving economic competitiveness.

Future opportunities are to conduct further case study research on how the Lean journey has evolved in ME's who have deployed Lean for over 2 years. Expanding this research on Lean deployment in ME's to other countries could expand understanding of Lean in ME's given the place of the ME in global economies. Also, the impact of Lean as an enabler for Industry 4.0 and increased digitalisation in ME's is an opportunity for further study.

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