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ANALYSIS AND IMPROVEMENT OF A PRODUCTION PROCESS THROUGH LEAN – 6 SIGMA: A CASE-STUDY AT SPARTRONICS VIETNAM

A Thesis in the Field of Operation Management

for the Double Master Degree in Production Engineering and Management

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The author

ABSTRACT

The thesis is developed throughout the project of improving production process at Tele-Radio line, Spartronics Vietnam. This work aims to apply Lean Manufacturing and 6 Sigma methodology according to DMAIC cycle to identify current issues and propose appropriate solutions for a continuous enhancement. The methodology used is based on DMAIC cycle with the following stages: Define, Measure, Analyze, Improve and Control. For each stage, some of Lean Six Sigma techniques is leveraged such as 5S, Pareto chart, Historical chart, 5WHYS, Fishbone diagram, Critical To Quality Tree, SIPOC diagram, Voice of Customer, Tree Diagram, and Sigma level. With the application of Lean – 6 Sigma tool, an estimation of quality cost saving for Spartronics Vietnam is figured out at approximately $33,727.2 in 2022. The quality level of Tele-Radio line has improved from 3.82 to 4.09 sigma, the First Pass Yield has increased from 93.3% to 98.89%. The result can be a useful case study for managers, project managers and engineers to implement specific improvement projects in electronics industry, especially for Box Build products. This study enriches the literature by providing in-depth information on the reasons for combining the Lean and Six Sigma techniques. Although there are many previous research in developed countries that study about applying Lean – 6 Sigma methodology and DMAIC cycle in electronics industry, this thesis is the very first one conducted in Spartronics and in Vietnam. Therefore, it could be a valuable document for training and reference in the future.

Keywords: *Lean Manufacturing, 6 Sigma, Lean-6 Sigma, DMAIC cycle, Operation Management, Electronics*

ABSTRACT IN ITALIAN

La tesi si sviluppa nell'ambito del progetto di miglioramento del processo produttivo presso la linea Tele-Radio, Spartronics Vietnam. Questo lavoro mira ad applicare la metodologia Lean Manufacturing e 6 Sigma secondo il ciclo DMAIC per identificare le problematiche attuali e proporre soluzioni appropriate per un miglioramento continuo. La metodologia utilizzata si basa sul ciclo DMAIC con le seguenti fasi: Definire, Misurare, Analizzare, Migliorare e Controllare. Per ogni fase, vengono sfruttate alcune delle tecniche Lean Six Sigma come 5S, grafico di Pareto, grafico storico, 5WHYS, diagramma Fishbone, albero critico per la qualità, diagramma SIPOC, voce del cliente, diagramma ad albero e livello Sigma. Con l'applicazione dello strumento Lean - 6 Sigma, una stima del risparmio sui costi di qualità per Spartronics Vietnam è calcolata a circa $33,727.2 nel 2022. La qualità della linea Tele-Radio è migliorata da 3,82 a 4,09 sigma, l'FPY è aumentato dal 93.3% al 98,89%. Il risultato può essere un utile caso di studio per manager, project manager e ingegneri per implementare progetti di miglioramento specifici nell'industria elettronica, in particolare per i prodotti Box Build. Questo studio arricchisce la letteratura fornendo informazioni approfondite sui motivi per combinare le tecniche Lean e Six Sigma. Sebbene ci siano molte ricerche precedenti nei paesi sviluppati che studiano l'applicazione della metodologia Lean – 6 Sigma e del ciclo DMAIC nell'industria elettronica, questa tesi è la prima in assoluto condotta in Spartronics e in Vietnam. Pertanto, potrebbe essere un valido documento di formazione e riferimento in futuro.

Parole chiave: *Lean Manufacturing, 6 Sigma, Lean-6 Sigma, DMAIC cycle, Operation Management, Electronics*