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978-1-107-40719-0 - Lean Evolution: Lessons from the Workplace

Nick Rich, Nicola Bateman, Ann Esain, Lynn Massey and Donna Samuel

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Lean Evolution

Lean thinking is a powerful method that allows organisations to improve the productivity, efficiency and quality of their products or services. Achieving these benefits requires good teamwork, clear communication, intelligent use of resources and a commitment to continuous improvement. This book shows how lean thinking can be applied in practice, highlighting the key challenges and pitfalls.

The authors, based at a leading centre for lean enterprise research, begin with an overview of the theory of lean thinking. They then explain the core tools and techniques and show how they can be applied successfully. The detailed implementation of lean thinking is illustrated by several case studies, from a range of industries, in which the authors had unprecedented access to the management teams.

With its focus on implementation and practical solutions, this book will appeal to managers at all levels, as well as to business students and researchers in lean thinking.

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Glossary

ABC	A means of categorising products, failures or other group of observed issues such that the most important sources can be identified in terms of the impact and volume. ‘A’ classifications are therefore the most important and ‘C’ the least and this allows problem solving to be directed to those issues/products with the most potential benefit to the company.
agile manufacturing	The ability to accommodate change responsively in terms of volume and mix flexibility.
Andon	A subset of visual control management which is used to signal abnormalities with the production process or to identify deviations between the desired pace of the work station/assembly line and takt time requirements.
autonomous maintenance	Those activities of routine equipment maintenance conducted by individuals and small groups to a level of safety and quality assurance established by the business/engineering specialists. This is the front line of maintenance activity and is used to detect and correct abnormalities quickly.
CANDO cellular manufacturing	Also known as the 5S system or workplace discipline and control A layout choice which involves the co-located configuration of machinery in a manner that the output of one machine directly feeds the next or feeds a small buffer before the next. The ideal cell adopts an approach of ‘one piece flow’.
changeover	The time taken from the last good piece produced from the existing batch of work at a machine to the first ‘accepted’ good product from the new batch. A concept developed by Shigeo Shingo.
constraint	The bottleneck or limiting factor (either equipment, human or management policy) which limits the throughput and output of production. A concept developed by Eli Goldratt using the ‘theory of constraints’ approach to operations management.

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continuous improvement (kaizen)	From the Japanese meaning ‘virtuous circle’. Meaning small step changes in performance as a result of continued analysis and process changes to improve the efficiency and effectiveness of production or administrative activities.
control item	An element of a product or production system used to assess whether the system is working within an agreed specification. Used to prompt action upon detection of variation which may cause defects or instability.
defects	The manifestation of an error within the production system which results in ‘un-saleable’ products or stopped administrative process. An error represents a deviation, by humans or machines.
error proofing	The design of processes and devices which prevent the creation of errors and defects through physical means, i.e. the prevention of accidental consumption of tablets through the introduction of caps to medicine bottles that can only be operated by adults (push, twist, and turn) or the use of the physical size of the product to prevent misalignment (i.e. a 3.5 inch floppy disk can only be entered into a 3.5 inch drive in one exact way).
Just-In-Time	The generic name given to the logistics of the Toyota production system as opposed to the lean enterprise which covers the production, management and supply chain processes.
kaikaku	From the Japanese meaning radical break to the circle of improvement. This approach is a very condensed and intense activity conducted within the factory to make an instant improvement in performance and to demonstrate that change can be instantaneous.
kanban	From the Japanese meaning ‘ticket’ and referring to the information cards used to trigger the removal and manufacturing of replenishments within a manufacturing system. The cards cycle between internal customers and suppliers to ensure production occurs Just-In-Time.
lead time	The total time a piece of material resides in the production system from start of production to finished goods. Also used as quoted ‘order receipt to delivery time’ when interacting with customers and this includes all administrative processes, manufacturing, queuing and despatch activities.
LERC level scheduling	The Lean Enterprise Research Centre, Cardiff Bussiness School. The lean approach to smoothing production requirements over a time period so that the same amount is produced every week etc. The logic is not to batch production and incur long periods between making the same product, but to cycle quickly through the entire range of products so as to minimise delays and limit any queues.
MRP	Material requirements planning. A computerised scheduling system, originated in the 1950s, which served to time the arrival of materials from

	suppliers and from within the factory through computer-calculated and printed schedules. These systems did not calculate whether capacity was available to produce.
MRPII	Manufacturing resources planning. An extension of MRP which utilised advancement in computing power of the 1970s and also more sophisticated algorithms to find the ‘best fit’ schedule that matched customer delivery dates and available capacity to produce.
NVA	Non-value adding or actions conducted by the organisation that adds no value to the product and serves to increase costs. Activities for which the customer would prefer not to pay.
OEE	Overall equipment effectiveness – the baseline measure of all TPM activities and a means of charting progress (through trend analysis) of improvement activities.
one piece flow	The smallest manufacturing batch size and unit of flow around a cell. One piece is taken from raw to finished stage in one single loop of activity involving ‘walking’ operators that handle multiple machines to manufacture the product. It may then be processed further by another operation.
Policy deployment	The process of setting a 3–5 year business goal and annual improvement challenges to all business functions. The total population of middle managers agree the key projects which will enhance the competitiveness of the firm and collaborate to ensure their execution. The hidden lesson of lean manufacturing.
product family	A group of products that share a similar value stream, product characteristics and/or sales patterns. These stock-keeping units are grouped to form a band of products that are used to create volume for a cell design or a means of analysing the critical flows of materials within a factory.
pull	The approach to triggering manufacturing operations using the ‘kanban’ replenishment system, whereby movements of finished products trigger re-supply from internal processes.
push	The generic term used to define manufacturers that schedule production and often operate ‘make to finished stock’ operations systems.
right first time	A surrogate measure for zero defects which applies to perfecting production and administrative processes such that the activity never involves an error.
single minute exchange of dies	The term applied to changeover activities of less than ten minutes. This is the base line of quick changeover improvements and will lead, through re-engineering, to ‘one touch’ exchange of dies (OTED). This process is

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	important as it allows smaller batch sizes and more variety of production (scope) to be achieved in a single shift.
Six Sigma	A powerful new approach to quality management, which represents a goal (target value) and a methodology. It fully supports lean production.
standardised work	The codified and visual documentation, written by operators and specialists, to assist learning and conduct of repetitive operations. Displayed at the point of use – these documents are the basis for improvement activities as much as they are the standards that sustain a common way of working.
takt time	The rate of production needed to equal the average rate of product sales to customers. This calculation is used to ensure flow processes are performing effectively or that buffers are being replenished at the desired rate.
target cost	An approach to determining product features and costs using a backward process of deducting marginal, distribution costs to derive the maximum cost of production. This cost is used as a challenge to product and process designers. The objective is to meet the cost or design products with lower costs to enhance margins and profitability.
TPM	An approach and methodology for creating ‘robust’ production systems through improving the technical skills of the workforce and the specifications of the manufacturing technologies employed.
TPS	Toyota production system – the logic and implemented features of the originator of the lean system.
U cell	The preferred layout of a lean cell due to the ability to reduce and flex the amount of labour needed through ‘walking single piece flow’ (also known as motion kaizen) by the operator.
value adding	An activity for which the customer is prepared to pay – typically a transformation process within the value stream.
value stream	The internal activities which must come together to produce an output and more broadly those processes within each tier of the supply chain which span raw materials production to consumer. Includes order fulfillment and design value streams.
value stream mapping	A portfolio of techniques used to visualise and diagnose the current status and future potential improvements within and beyond the factory. Essentially management techniques for operations system design purposes.
visual control	An approach to visualising the status of a process and to make deviation in performance readily identifiable without need for specialist training.

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	Examples include vehicle dashboards and warning lights which prompt the driver to stop etc.
work in process	Also called ‘work in progress’ and contains all materials held within a factory that are part finished and lie between raw and final stages. Approach is to standardise and minimise this level of materials until production flow can be used to displace the inventory.
zero defects (ZD)	The ultimate goal of all companies that seek to compete on quality of product. ZD is a measure of internal process control as much as it represents fault-free customer service to external organisations/consumers.