



Prifysgol Cymru
Y Drindod Dewi Sant
University of Wales
Trinity Saint David

LOCATION: SWANSEA

LLEOLIAD: ABERTAWE

LEVEL 6

LEFEL 6

EXAMINATION PERIOD
JANUARY 2021

CYFNOD ARHOLIADAU
IONAWR 2021

MODULE CODE: M6X01290
Operations Analysis

TIME: 4 HOURS

ANSWER THREE QUESTIONS OUT OF FOUR

Equipment or materials required – None

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François LE MOIGNE

Question 1

Critically discuss the benefits and limitations of lean operations providing examples (33.3 marks)

Lean is an approach to operations that seeks to achieve a flow of materials, information or customers that delivers exactly what customers want (perfect quality), in exact quantities (neither too much nor too little), exactly when needed (not too early nor too late), exactly where required (in the right location), and at the lowest possible cost. It can be viewed in three related ways – as a philosophy, as a method of planning and control and as a set of improvement tools.

Lean uses a 'pull system' to manage flow of products and services as opposed to a 'push system' in traditional operations.

Lean focuses on the removal of inventory in order to expose operations problems. It places less emphasis on maximizing capacity utilization given there is little value in producing products or processing customers if the next stage in the process is not ready to receive them.

Behavioural change is at the centre of lean philosophy, with particular emphasis on the involvement of all staff in driving improvement on an on-going basis. (Slack)

The main advantages of lean operations:

- A reduction in costs

Lean management is about maximising profits and this means eliminating waste. In fact, its aim is the elimination of all forms of waste. Waste can be defined as any activity that does not bring any added value. For example, studies often show that only 5% of total production time is actually spent on direct value addition. This means that for 95% of its time, an operation adds costs to the service or product without adding value.

- Increased customer interactions

Lean management is a process that takes into account the customer's point of view. Indeed, thanks to Lean, staff and customer communicate a lot, which allows the reduction of errors.

- Quality improvement

One of the main objectives is to reduce the number of product defects. This saves time and money as there will be no time spent redoing the product.

- Improved employee morale

Lean operations, improves employee morale, because they are in constant communication with their manager, which allows them to be recognised and improve their performance.

The main disadvantages of lean operations:

- The inventory problem

In lean operations, stock quantities are low, which means that if there is a delivery problem with one supplier, the whole company is disrupted.

- Difficult to change

It is difficult to adapt to lean operation, because it takes a long time to implement and completely changes the basic processes, which can be a problem with employees in these companies, who do not want to see their working methods changed.

Moreover, the larger the company, the more difficult it is to implement lean management. Even more so if the company is international and has to change its system in different countries.

- High cost of implementation

Adopting lean operation means that the company will have to stop its process, which can lead to high costs for companies that are not used to such a change.

- Stress for employees

Indeed, if the company prioritises productivity gains over the well-being of its staff, employees will find it difficult to adapt, and will see customer satisfaction take precedence over their comfort at work. This can lead to stress and even musculoskeletal disorders.

Question 3

Comparatively discuss Total Quality Management (TQM) versus Six Sigma (33.3 marks)

Today, quality is seen as a key to success for companies, and in order to achieve quality, effective concepts and tools exist to enable companies to achieve their goals. The main objective of companies is to satisfy the customers, and this is possible by having a maximum quality on the products and services offered. TQM and Six Sigma, are tools that help to achieve quality.

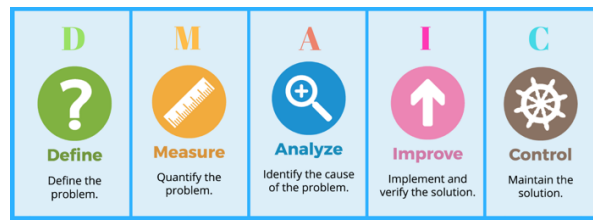
Total Quality Management (TQM) is an organisational process that actively involves every function and every employee with the aim of satisfying customer needs. TQM works by continuously improving all aspects of work through structured monitoring, improvements and planning activities that are carried out in accordance with a guiding ideology that emphasises quality and customer satisfaction as top priorities.

The main issues of the TQM are:

- Building customer loyalty
- Have a good company image
- To have a good quality of its organisation
- Being in a risk prevention approach
- Making good use of company resources
- To always be in a process of continuous improvement

Six Sigma can be identified as a quality measurement tool that leads to perfection. It is a method of process improvement that tends to reduce the causes of variability at the origin of malfunctions and the non-quality of products. The success of a Six Sigma project depends on the involvement of all players.

Six Sigma aims to reduce the variability of processes in order to make them reliable, stable and predictable, and to ensure the "perfect" reproducibility of the process in order to move towards Zero Defects and thus satisfy customers. It enables the full rigour of DMAIC project management and statistical data analysis to be applied to the resolution of complex problems in which a large number of factors impact the result.



The 5 different steps of the DMAIC method. (MSysTraining)

Question 4

Discuss the role and methods of statistics process control (SPC) to support quality characteristics in the operations (33.3 marks)

In recent years, technological innovations have made it possible to improve the techniques of companies, bringing more advanced and technical methods in quality control. SPC is one of these techniques.

SPC, is a statistical process control. Its aim, through the use of graphs and control charts, is to evaluate deviations from a reference value, in order to anticipate the measures to be taken to improve any industrial manufacturing process. This makes it possible to evaluate and correct several quality characteristics in the operation.

For example, a station may regularly ask a sample of customers whether the cleanliness of its toilets is satisfactory. If an unacceptable number of customers in a sample is found to be unsatisfactory, station managers may need to consider improving its procedures.

The SPC is based on 3 basic principles:

- it is the process that produces the product
- the behaviour of processes fluctuates over time
- processes tend to disorganise and degrade over time

The aims of the SPC are:

- to avoid costs due to non-quality. When a customer orders a product, the delivered product must correspond exactly to what the customer ordered. If this is not the case, this can lead to a return of goods for non-compliance with customer requirements, or the loss of the customer to a more efficient company.

- to avoid the drifts of the process. This involves identifying the roles of each person, which is what the SPC allows. This allows to react faster to abnormal variation of a process.

The use of simple statistical techniques to conduct a manufacturing process makes it possible to prevent the effects of deviations instead of undergoing them and to sort production, to avoid 100% control and to rationalise sampling plans rather than choosing them "by experience".

The proper functioning of the SPC, lies in the use of control cards that allow the performance of one or more quality characteristics to be monitored in the operation.

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