



Higher Still Notes

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Higher Business Management

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Operations Management

What is Operations Management all about?

An organisation's production function is the set of processes by which the organisation converts raw materials (e.g. labour, components, etc.) into saleable finished goods or services. Every organisation's production function has 3 main stages:

- Input
- Process
- Output

An organisation's operating system is a set of procedures (or rules) which are set up effectively and efficiently organise and manage their production function. The main things which an operating system will be concerned with are:

- Planning the production process.
- Controlling the production process.
- Monitoring the production process.
- Maximising the efficient use of resources.
- Monitoring and controlling quality levels.
- Monitoring and controlling workers' activities.

The main factors which must be considered when developing this operating system are:

- The nature of the product.
- The quantity to be produced.
- The level of quality required.
- The resources available.
- The nature of the resources available (capital versus labour-intensive).

Operations management is concerned with making sure that all of an organisation's goods and services are manufactured as efficiently as possible through effective control and management of an organisation's operating system and production function.

Operating Activities

The main activities that are involved in operations management can be split up into the three main stages of the production function, as follows.

Inputs

- Selection of raw materials.
- Storage of raw materials.

Processes

- Which production system to use.
- Which staff payment/incentive system to use.
- Production quality issues.

Outputs

- Storage of finished goods.
- Distribution of finished goods.

Why is Operations Management Important?

1. Necessity.

Without effective operations management through an operating system, an organisation would have nothing to sell and no income.

2. Lowered costs and increased profits.

Costs can be lowered and so profits are increased through:

- Cost-efficient input purchasing.
- Cost-efficient storage of inputs.
- Cost-efficient processing.
- Cost-efficient distribution of finished goods.

3. Better good provision and increased sales and profits.

Efficient operations management means that better quality goods are made (at low costs due to cost efficiencies) and so customer satisfaction, sales and profits will be improved.

Stock Control – Input Issue

Stock refers to unused quantities of:

- Raw materials (i.e. components used in production).
- Work in progress (i.e. partly-finished goods).
- Finished goods (i.e. finished goods to meet demand).

Stock control is concerned with trying to buy or hold levels of stock which will allow production and sales to take place, while minimising:

- Production stoppages (lost sales/good will from stock shortage).
- Stock outs (i.e. lost sales/good will from stock shortage).
- Opportunity cost (other uses for money tied up in surplus stock).
- Storage costs (i.e. warehousing, staffing, security).
- Spoilage costs (i.e. obsolescence or wastage of stocks).
- Admin/finance costs (order processing, etc.).

In order to try and achieve this aim, efficient stock control will involve deciding on an efficient level of stocks to hold.

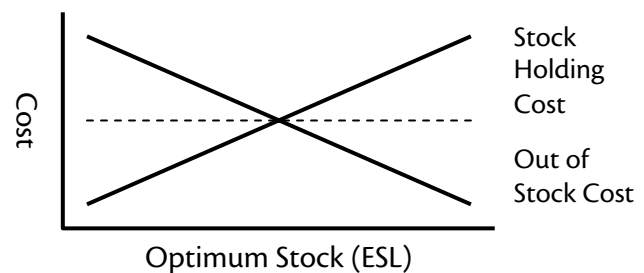
Deciding on an Efficient Level of Stocks

Here are two schools of thought:

An Economic Stock Level

Traditionally, many organisations used the economic stock level (ESL) method to determine an optimum stock level which minimises both stock holding and stock out costs, as the diagram shows.

The ESL system ensures that adequate stocks are always at hand while costs are minimised by systematically reordering/producing a specific amount of stock at appropriate times to maintain this optimum stock level.



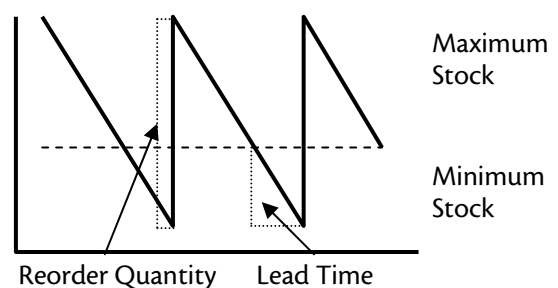
The ESL system operates through the establishment and implementation of:

- Economic stock level.
- Minimum stock level.
- Reorder stock level.
- Economic reorder quantity.

The precise values for these factors and overall stock levels under ESL will depend upon:

- Demand – stock should meet normal demand and allow for unexpected changes.
- Seasonal factors – i.e. seasonality can affect levels, e.g. toys at Christmas.
- Stock holding costs – i.e. if stock costs are high then stocks will be low.
- Working capital available – e.g. low capital available implies low stocks.
- Stock type – e.g. fashionable/perishable goods stock are likely to be small.
- Lead time – i.e. how long it will take for new stock to be received from suppliers.
- External factors – e.g. risks of shortages may encourage stock holdings (fuel strike etc.).

The operation of the ESL system over time is on the right – the stock level will fluctuate as stock is used, and will need to be re-ordered once it reaches the dashed line. The area under the dashed line is the lead time, i.e. the amount of time required for the supplier to deliver the new stock. The reorder quantity is the vertical line of the graph.



Zero Stocks

JIT (Just-in-Time) purchasing is a Japanese alternative to traditional purchasing methods which involves holding zero (or very few) stocks and purchasing materials for each specific order 'just in time' to fulfil it.

The system brings the organisation the benefits of:

- Improved cash flow due to fewer stocks being held.
- Lowered stock holding costs due to decreased stocks and storage space.
- Less stock wastage, obsolescence and damage.
- More profits due to lower prices for consumers (due to lowered cost).

However, JIT has the following drawbacks:

- It can be difficult to respond to changes in demand due to reliance on others.
- Higher administration and transport costs.
- No opportunity for economies of scale due to continuous small purchases.
- Requires reliable suppliers to prevent problems, shortages and lost sales.
- Requires skilled workers to prevent errors, shortages and lost sales.
- Requires good quality control to prevent errors and lost sales.

Establishing an Efficient Purchasing Mix

The purchasing mix is concerned with two things:

- How much stock should be bought?
- Who should the stock be bought from?

The answers to these questions will depend upon the method of defining stock levels used (i.e. ESL or JIT) as follows.

Economic Stock Level Purchasing Mix

How much should be bought?

The amount of stock purchased depends upon:

- Current stocks (from stock or bin cards).
- Time between this order and the next.
- Demand between this order and the next.
- Storage space available and its' cost.

Who should the organisation buy from?

Which suppliers the organisation should buy on will depend upon:

- Price – who has the lowest, best discounts or credit terms?
- Quality – is it acceptable and consistent?
- Availability – consistency, delivery services, etc.
- Location – is it good for delivery times and costs?

Just-In-Time Purchasing Mix

When JIT has been adopted, the quantity to be purchased will directly depend upon demand at that specific moment in time, and the supplier used will be unlikely to change as JIT producer-supplier relationships tend to be very stable due to careful supplier selection due to the need for reliability.

Conclusion

Purchasing mix decisions are of vital importance to the organisation as if they are not effective then the organisation may experience the following problems:

- Overstocking (and excess stock holding costs).
- Understocking (and increased risk of stoppages and stock-out).
- Extra expenses (from use of over-expensive suppliers).
- Poor quality stocks (from inefficient suppliers).

Choosing the Best Method of Stock Storage to be used

The purchasing department of any organisation will have to decide about the actual physical method of stock storage they will use. Again the answer will depend upon the method of defining stock levels used (i.e. ESL or JIT) as follows.

Economic Stock Level Storage

Here there are two options:

Centralised Storage

Here all stocks are kept together in one place, with these benefits:

- Improved security (from better procedures, facilities, staff).
- Improved efficiency (from better procedures, etc.).
- Economy of only one efficient site.

Disadvantages include:

- Time wasted travelling to centralised store.
- Cost of specialist staff.
- Cost of large dedicated storage area.

Decentralised Storage

Here stocks are kept in separate places with the following benefits:

- Stock is always “at hand” which saves time.
- Ordering can be more flexible and responsive.
- Small stocks mean speedier turnover and minimisation of dangers of obsolescence/spoilage.

Disadvantages include:

- Less controls – more wastage and theft.
- Takes up production space.

JIT Level Storage

When JIT has been adopted, storage should not be needed as the raw materials will be delivered directly to the production floor from immediate use.

Establishing Effective Stock Control Administration

The purchasing department should ensure that stock control, administration, stock taking and security are in place to make sure that stocks are monitored, controlled and recorded accurately to prevent:

- Over/understocking and associated costs.
- Wastage.
- Theft.

The administration of this stock control procedure will involve the recording of:

- Receipts.
- Issues (authorised by requisition).
- Current stock levels from a stock take.

This administrative work can be done either manually (on stock or bin cards) or on computer.

Many organisations are switching to the use of computerised systems due to the following advantages:

- Accuracy.
- Time saving (as they can automatically monitor and reorder).
- Labour saving (as they can automatically monitor and reorder).

However, even in large businesses, automation tends to be incomplete due to:

- Experienced controllers' ability to anticipate demand.
- The need to ensure the system is not overridden to hide theft or wastage.
- Staff resistance to change (and possible redundancies).

Methods of Production – Process Issue

The term “method of production” refers to the way an organisation chooses to physically organise the production process. There are three main methods of production that you should be aware of:

Job Production (e.g. jewellery, roads, boats, buildings)

Features

- One product is made at a time.
- Products are individual.
- Labour intensive.

Advantages

- Individual products are of high quality.
- High quality provides customer satisfaction.
- Organisation is flexible and dynamic.
- Workers are motivated due to skills/involvement.

Disadvantages

- Costly due to lack of economies of scale.
- Costly due to staff skills and equipment.
- Production can take time.

Batch Production (e.g. pizzas, soups, bread)

Features

- A batch (or group) of identical products are made together.
- Different batches can be modified slightly.
- All products are broadly similar.
- Similarity in most stages of production.

Advantages

- Variation between batches provides flexibility – you can make different ‘types’ of product using the same equipment, e.g. different flavours of soup by changing ingredients.
- Overall similarity of batches allows economies of scale.

Disadvantages

- Small batches increase unit costs.
- Delays from changes in batches.
- Coordinating different batches can be difficult.

Flow Production (e.g. cars, televisions, fridges, newspapers)

Features

- Identical products.
- Production line based manufacturing.
- Large scale manufacturing.
- High levels of output.
- Capital intensive.

Advantages

- Economies can be effectively harnessed.
- Cost-effective automation possible.
- Stockholding costs minimised due to standardisation.
- Quality can be built in due to standardisation.

Disadvantages

- Start up costs tend to be high.
- Standard product may not suit all.
- Production is inflexible.
- Work can be repetitive and boring.
- Individual system failures can halt all of production.
- Mass production relies on mass consumption.

Quality Management – Process Issue

What “quality” is can be difficult to quantify exactly, as different parties have different opinions simply because of their own perspective.

For example, consumers may use the following features to define quality:

- Satisfaction of consumer needs (design quality).
- Physical make-up.
- Reliability and durability.
- Special features.
- Parts, repairs and maintenance.
- After care service.
- Perceived qualities – brand reputation and image.

Meanwhile, a producer may define the same item as quality because:

- It meets exact specifications (manufactured quality).
- It's complaint-free and satisfies consumers (design quality).
- It's production is cost-effective.
- It can be produced under current conditions.

However, many feel that an acceptable definition of quality which accounts for most parties' points of view is:

“A quality product or process is one which provides satisfaction of consumer needs (through design quality) and sufficient reliability (through manufacture quality) relative to cost.”

For example, a BIC biro is a quality product because as a disposable pen it does what consumers want – it writes, and is reliable relative to its low cost. You wouldn't expect its ink to flow for years, but it's cheap enough to replace.

What can be done to ensure Quality?

To ensure that they are producing a quality good or service, an organisation can:

- Ensure its purchasing mix is effective in securing quality materials.
- Use marketing to ensure product meets consumer expectations.
- Use quality assurance in operations.
- Use total quality management (TQM) in operations.
- Use quality control (if assurance/TQM) are not be used.
- Use quality circles.
- Use benchmarking.
- Establish and use control procedures and manuals.
- Pursue and operate according to UK Quality Standards (including BS5750).
- Pursue and operate according to international quality standards (including ISO9000).
- Pursue and operate according to EUQM awards.
- Pursue and operate according to Investors in People (IIP) awards.
- Pursue and operate according to professional standards (e.g. Kitemark, ABTA).

What will Limit the Level of Quality which can be Achieved?

The following factors affect the level of quality which an organisation can attain:

- The time, resources and technology available for production.
- The quality of raw materials.
- The commitment and skills of the workforce.
- The rate of staff turnover.
- The quality of the monitoring and control processes in place.
- The ability to meet delivery deadlines.
- The after-sales service facilities available.

Benefits gained form Effective Quality Management

Effective quality management is today, commonly seen as the implementation of Quality assurance and particularly TQM over traditional methods of quality control. This is the case for the following benefits and reasons:

- Lower levels of defects (3%) increases the number of goods for sale.
- Lower levels of defects decreases production costs and so raises profits.
- Increased competition means sales cannot afford to be lost due to defects.
- Today's law means a greater chance of legal action over any defects.
- Improved corporate image for reliability and quality increases loyalty.
- Unacceptable costs of quality control and rejections (30%).
- Empowers workers and so generates motivation and more output.
- Increased profits may allow for better wages and facilities for workers.
- Better patterns of output (i.e. no slacking off in the afternoons).

Costs of Effective Quality Management

Despite the overall benefits, it does also result in the following additional costs for an organisation:

- Time and money to develop the quality management system used.
- Cost of monitoring the system (e.g. wages or technology).
- Cost of reworking or scrapping unsuitable products which are identified.
- Cost of raising quality standards (e.g. new machinery, training, and other requirements).
- Time and money required to address any faults in the system.

Implementation and Operation of Effective Quality Management

To maximise the benefits and minimise the costs of effective quality management its' implementation and use must be carefully managed to ensure workers take the necessary responsibility and do not continue to simply believe quality is an issue for management alone.

Effective implementation of quality assurance and TQM can be achieved by:

- Effective use of interpersonal/managerial skills.
- Ensuring all staff and unions are aware of cost (and wages) benefits.
- Ensuring all staff aid the planning of quality procedures.
- Congratulating/rewarding those who participate/are effective in quality.
- Starting and implementing a test scheme to show benefits.

Effective operation of quality assurance and TQM requires:

- Ensuring that "customer-focused quality" is clearly defined to all involved.
- Ensuring all staff are clear about, and committed to, their involvement.
- Ensuring systems are in place to achieve and maintain quality output.
- Ensuring resources required to meet standards are available.
- Ensuring staff training required to meet standards are available.
- Monitoring that quality standards are met and remediating as necessary.

Payment Systems – Process Issue

Fixed Amount Payment Systems

Fixed amount systems do exactly what they suggest – they pay staff a fixed amount per month irrespective of (extra) hours worked. Examples of fixed amount payment systems include salaries and contract work.

Fixed rate payments can be demotivating to staff if they feel that they are working harder than others for the same pay, and can result in them failing to see the benefit of extra effort and in turn deciding to decrease their efforts in line with those of other less-committed workers.

However, if staff do not see this as the case, then the employer will benefit on occasion from extra work completed without extra pay.

Incentive-Based Payment systems

These aim to increase output and sales by motivating staff through payments directly linked to their performance and productivity. Examples of these systems include:

- Piecemeal/piece-rate systems.
- Commission.
- Bonuses.
- Profit-sharing schemes.
- Profit-related pay.

These schemes have several drawbacks.

Demotivating Fluctuating Earnings

Production may not take place in a uniform way (due to changes in demand, machinery breakdowns, etc.) which can mean that through no fault of their own employees to not receive their incentive payments and so become unmotivated.

Poor Quality

If employees have to worry about quantity rather than quality in order to get their incentive payment, quality may suffer as staff simply ignore such concerns as they aim to make as much as possible.

Demotivating System Changes

Incentive systems will constantly change to prevent employees manipulating them. However, this can demotivate staff as they may not know exactly what their incentive actually is.

Decreased Quality of Working Life

Many incentive schemes are based around tightly controlled and repetitive process-based production systems which employees may find boring, and in turn, demotivating.

Demotivating Jealousy

Staff may become jealous of each others payments which may break down team efficiency and morale.

However, despite these drawbacks, many organisations still use incentive schemes because:

- Money tends to have a direct effect on most individuals' motivation and acceptance of change.
- The empowerment it can provide some employees, allowing them to feel they have some control over their working activities.

Output Issues

Scheduling

The organisation must ensure that the production and distribution of finished goods is systematically organised and coordinated to prevent any delays or problems in satisfying customers.

Warehousing

This is the physical (centralised or decentralised) storage of finished stocks. Warehouse planning and organising will focus on:

- Design and layout.
- Mechanical handling.

Method of Delivery Transport

Delivery transport may be internally or externally resourced, and the most popular method used within the UK include road (81%), pipe line (6%), water (7%), and rail (6%) [figures correct in 2002].

The choice of method will depend on:

- Cost.
- Product nature.
- Delivery speed required.
- Delivery coverage required.

Distribution Mix Used

Distribution can be achieved through the individual or combined use of:

- Direct sales.
- Retailers.
- Wholesalers.
- Importers.

The choice will depend upon:

- Product nature.
- Product coverage required.
- Cost of distribution and finance available.
- Control demanded.
- Product image.
- Effectiveness in reaching the customer.
- Reliability in reaching the customer.

The methods which are becoming most commonly used are direct sales and branded retailing, due to:

- Changes in lifestyle.
- Increased opening hours and diversification.
- More retail parks and shopping centres.
- More call centre-based sales.
- Increased direct online shopping.
- The decline of the independent retailer.
- The wish to reduce costs for competitive reasons.
- The pursuit of more profits and branding.