Unit 34: Operations Management

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Learning Outcome 4

- LO4 **Be able to apply relevant techniques to the production of an operational plan for an organisation.**
  - Ac 4.1 Produce a set of clearly defined operational outcomes for a selected organisation
  - AC 4.2 Produce a network plan indicating the resultant critical path.
  - AC 4.3 Justify how quality management techniques are applied to improve operations in a selected organisation

In this Session

- LO4 **Be able to apply relevant techniques to the production of an operational plan for an organisation:**
- AC 4.3 Justify how quality management techniques are applied to improve operations in a selected organisation:
  - Monitoring and control techniques
  - continuous improvement;
  - quality characteristics;
  - importance of quality
- Further readings
- References

Monitoring and control

- Operations Management is gifted with several techniques to assist in the monitor and control of the production:
  - quality assurance and quality control mechanisms (Q.A.C)
  - fish bones;
  - quality circles;
  - variance analysis,
  - six sigma, product quality and service quality, benchmarking;
  - self-assessment;

Quality Assurance and Quality Control Mechanisms (Q.A.C)

- According to Arthur (2012) it is important for an organisation to agree on what the meanings of **Quality Assurance** (QA) and **Quality Control** (QC). Both form an integral part of the organisation's quality management plan, and the effectiveness of delivery teams relies on the differences being well understood by all stakeholders, including management.
- Although QA and QC are closely related concepts, and are both aspects of quality management, they are fundamentally different in their focus:
  - QC is used to verify the quality of the output;
  - QA is the process of managing for quality.

Quality Assurance and Quality Control Mechanisms (Q.A.C)

- *Quality Control* (QC) is a system of routine technical activities, to measure and control the quality of the inventory as it is being developed. The QC system is designed to:
  i. Provide routine and consistent checks to ensure data integrity, correctness, and completeness;
  ii. Identify and address errors and omissions;
  iii. Document and archive inventory material and record all QC activities.
- QC activities include general methods such as accuracy checks on data acquisition and calculations and the use of approved standardised procedures for emission calculations, measurements, estimating uncertainties, archiving information and reporting. Higher tier QC activities include technical reviews of source categories, activity and emission factor data, and methods.

Quality Assurance and Quality Control Mechanisms (Q.A.C)

- *Quality Assurance* (QA) activities include a planned system of review procedures conducted by personnel not directly involved in the inventory compilation/development process. Reviews, preferably by independent third parties, should be performed upon a finalised inventory following the implementation of QC procedures. Reviews verify that data quality objectives were met, ensure that the inventory represents the best possible estimates of emissions and sinks given the current state of scientific knowledge and data available, and support the effectiveness of the QC programme.

Fish Bone Analysis

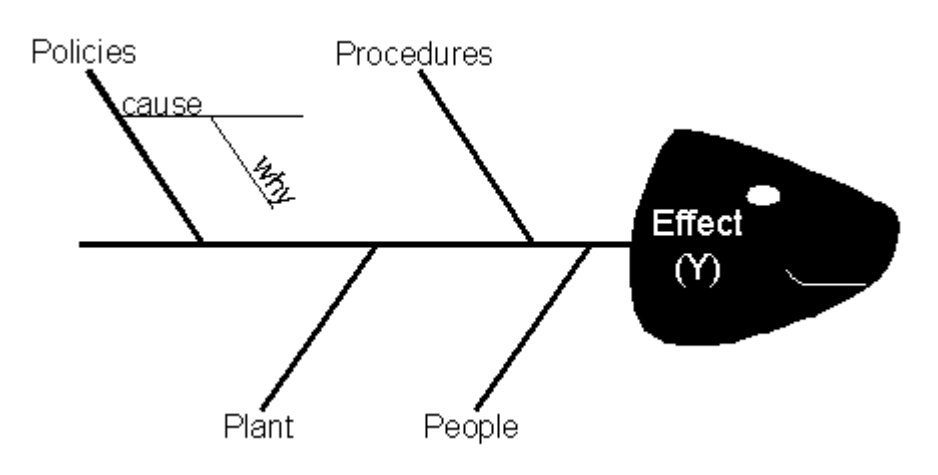
- When utilizing a team approach to problem solving, there are often many opinions as to the problem's root cause. One way to capture these different ideas and stimulate the team's brainstorming on root causes is the cause and effect diagram, commonly called a fishbone. The fishbone will help to visually display the many potential causes for a specific problem or effect (Simon, 2016). It is particularly useful in a group setting and for situations in which little quantitative data is available for analysis.

- The fishbone has an ancillary benefit as well. Because people by nature often like to get right to determining what to do about a problem, this can help bring out a more thorough exploration of the issues behind the problem – which will lead to a more robust solution.

- To construct a fishbone, start with stating the problem in the form of a question, such as "Why is the help desk's abandon rate so high?" Framing it as a "why" question will help in brainstorming, as each root cause idea should answer the question. The team should agree on the statement of the problem and then place this question in a box at the "head" of the fishbone.

Sample Fish Bone

Diagram



Areas of Focus/Analysis

- Service Industries (4 Ps) – Policy, Procedures, People, Plant/Technology
- Manufacturing Industries (6 Ms) – Machines; Methods; Materials; Measurements; Mother Nature (Environment); Manpower (People
- Process Steps (eg.) Determine Customers; Advertise Product; Incent Purchase; Sell Product; Ship Product; Provide Upgrade

TRAINING

- Appropriate training for different sections of employees needs to be imparted. Without a proper understanding of the real concept of Quality Circles, both the workers and management might look at this philosophy with suspicion. Each group should know beforehand the commitments and implications involved as well as the benefit that can be obtained from Quality Circles. Such training comprises of :

  Brief orientation programme for top management.
  Programme for middle level executives.
  Training of facilitators.
  Training for Circle leaders and members.

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- Quality Circles have emerged as a mechanism to develop and utilize the tremendous potential of people for improvement in product quality and productivity.

Quality Circle

- Quality Circle is a small group of 6 to 12 employees doing similar work who voluntarily meet together on a regular basis to identify improvements in their respective work areas using proven techniques for analysing and solving work related problems coming in the way of achieving and sustaining excellence leading to mutual upliftment of employees as well as the organisation.
- It is "a way of capturing the creative and innovative power that lies within the work force".
- Quality Circle concept has three major attributes:
  - Quality Circle is a form of participation management.
  - Quality Circle is a human resource development technique.
  - Quality Circle is a problem solving technique.

Objective of Quality Circle

- The objectives of Quality Circles are multi-faced:
  - Change in Attitude – From "I don't care" to "I do care." Continuous improvement in quality of work life through humanisation of work.
  - Self Development – Bring out 'Hidden Potential' of people. People get to learn additional skills.
  - Development of Team Spirit – Individual Vs Team – "I could not do but we did it" Eliminate inter departmental conflicts.
  - Improved Organizational Culture – Positive working environment. Total involvement of people at all levels. Higher motivational level. Participate Management process.

Variance Analysis

- Variance analysis, also described as analysis of variance or ANOVA, involves assessing the difference between two figures (Cross, 2016). It is a tool applied to financial and operational data that aims to identify and determine the cause of the variance. In applied statistics, there are different forms of variance analysis.
- In project management, variance analysis helps maintain control over a project's expenses by monitoring planned versus actual costs. Effective variance analysis can help a company spot trends, issues, opportunities and threats to short-term or long-term success.

Importance of Variance Analysis

- **Forecasting** is an important type of prediction is business forecasting. It uses patterns of past business data to construct a theory about future performance. Variance data are placed into context that allows an analyst to identify factors such as holidays or seasonal changes as the root cause of positive or negative variances.
- For example, the monthly pattern of sales of television sets over five years might identify a positive sales trend leading up to the beginning of the school year. As a result, forecasts for television sales over the next 12 months might include increasing inventory by a certain percentage — based on historical sales patterns — in the weeks before the start of local universities' fall term.

Six Sigma

- Six Sigma at many organizations simply means a measure of quality that strives for near perfection. Six Sigma is a disciplined, data-driven approach and methodology for eliminating defects (driving toward six standard deviations between the mean and the nearest specification limit) in any process – from manufacturing to transactional and from product to service (isixsigma.com, 2016).

- The statistical representation of Six Sigma describes quantitatively how a process is performing. To achieve Six Sigma, a process must not produce more than 3.4 defects per million opportunities. A Six Sigma defect is defined as anything outside of customer specifications. A Six Sigma opportunity is then the total quantity of chances for a defect. Process sigma can easily be calculated using a Six Sigma calculator.

Six Sigma Methodologies

- The fundamental objective of the Six Sigma methodology is the implementation of a measurement-based strategy that focuses on process improvement and variation reduction through the application of Six Sigma improvement projects. This is accomplished through the use of two Six Sigma sub-methodologies: DMAIC and DMADV.
- The Six Sigma DMAIC process (define, measure, analyze, improve, control) is an improvement system for existing processes falling below specification and looking for incremental improvement.
- The Six Sigma DMADV process (define, measure, analyze, design, verify) is an improvement system used to develop new processes or products at Six Sigma quality levels. It can also be employed if a current process requires more than just incremental improvement. Both Six Sigma processes are executed by Six Sigma Green Belts and Six Sigma Black Belts, and are overseen by Six Sigma Master Black Belts.

Further Reading

- http://www.ipcc-nggip.iges.or.jp/public/gp/english/8_QA-QC.pdf
- https://www.dialog.com.au/open-dialog/the-difference-between-quality-assurance-and-quality-control/

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