

Assignment Guidance and Front Sheet

This front sheet for assignments is designed to contain the brief, the submission instructions, and the actual student submission for any WMG assignment. As a result the sheet is completed by several people over time, and is therefore split up into sections explaining who completes what information and when. Yellow highlighted text indicates examples or further explanation of what is requested, and the highlight and instructions should be removed as you populate 'your' section.

This sheet is only to be used for components of assessment worth more than 3 CATS (e.g. for a 15 credit module, weighted more than 20%; or for a 10 credit module, weighted more than 30%).

To be completed by the student(s) prior to final submission:

Your actual submission should be written at the end of this cover sheet file, or attached with the cover sheet at the front if drafted in a separate file, program or application.

Student ID or IDs for group work	5569029
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To be completed (highlighted parts only) by the programme administration after approval and prior to issuing of the assessment; to be consulted by the student(s) so that you know how and when to submit:

Date set	6 th January 2025
Submission date (excluding extensions)	20 th January 2025 by 12 pm UK time
Submission guidance	Tabula link
Marks return date (excluding extensions)	3 rd March 2025
Late submission policy	If work is submitted late, penalties will be applied at the rate of 5 marks per University working day after the due date, up to a maximum of 10 working days late. After this period the mark for the work will be reduced to 0 (which is the maximum penalty). "Late" means after the submission deadline time as well as the date – work submitted after the given time even on the same day is counted as 1 day late. For Postgraduate students only, who started their current course before 1 August 2019 , the daily penalty is 3 marks rather than 5.
Resubmission policy	If you fail this assignment or module, please be aware that the University allows students to remedy such failure (within certain limits). Decisions to authorise such resubmissions are made by Exam Boards. Normally these will be issued at specific times of the year,

	<p>depending on your programme of study. More information can be found from your programme office if you are concerned.</p> <p>If this is already a resubmission attempt, this means you will not be eligible for an additional attempt. The University allows as standard a maximum of two attempts on any assessment (i.e. only one resubmission). Students can only have a third attempt under exceptional circumstances via a Mitigating Circumstances Panel decision.</p>
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To be completed by the module owner/tutor prior to approval and issuing of the assessment; to be consulted by the student(s) so that you understand the assignment brief, its context within the module, and any specific criteria and advice from the tutor:

Module title & code	WM9F8-15 Quality, Reliability and Maintenance
Module owner	Jane Marshall
Module tutor	Jane Marshall
Assessment type	Essay
Weighting of mark	20%

Assessment brief
<p><u>QM Review</u></p> <p>From the QM presentations given in class produce a Quality Management critical review based on all the presentations and discussion given in class. You should use references to support your discussion.</p>

Word count	800
Module learning outcomes (numbered)	<ol style="list-style-type: none"> 1. Develop a critical understanding of Quality Management theories 2. Analyse lifetime data to measure reliability performance 3. Develop a conceptual understanding of maintenance philosophies.

	<p>4. Investigate the role of equipment asset management in an engineering business</p> <p>5. Evaluate how quality, reliability and maintenance tools are applied. to aid customer satisfaction</p> <p>6. Reflect on how the module enhances the product quality, reliability and maintenance of an engineering business</p>	
Learning outcomes assessed in this assessment (numbered)	1	
Marking guidelines		
Academic guidance resources	Module moodle, book list (on moodle), University Library databases	

The following is pre-populated for PGT assignments only:

Writing your Post-Module Assignment (PMA): specific additional advice for WMG's Postgraduate Taught Students
As a postgraduate level student in WMG you may have some concerns about your ability to write at the high standard required. This short guide is intended to provide general guidance and advice. It is important that if you have any questions you discuss them with your module tutor. Remember, in writing your PMA you need to meet the expectations of the reader and university.
A good PMA generally requires you to answer the question and to include...

1. A title, with your student number, module, lecturer's name and any other documentation required by the university.
2. A contents page and if appropriate, an abstract.
3. An introduction which acts as a 'map' to the rest of the document, describing the aim or purpose of the work and explaining how this aim is achieved. At this point it is usually helpful to paraphrase your conclusion.
4. Evidence of an appropriate level of background reading of relevant texts.
5. Evidence of systematic and clear thinking, indicative of good planning and organisation.
6. Writing which makes sense, is clearly and carefully presented (proof-read and grammar checked).
7. A critical style of writing which compares and contrasts the main theories, concepts and arguments with conclusions that are based in evidence presented.
8. A logical and well-defined structure with headings and subheadings.
9. Clearly labelled and well-presented diagrams and other graphics that are discussed in the text.
10. Adherence to usual academic standards including length and a timely submission.
11. A reference section in which every source that is cited in the text is listed and please ensure that you underpin the discussion throughout with relevant academic material to support the content, using the Harvard approach.

Where to get help:

1. **Talk to your module tutor if you don't understand the question or are unsure as to exactly what is required.**
2. Study, Professional and Analytical Skills (SPA) Moodle site – we have a lot of resources on this website with workbooks, links and other helpful tools. <https://moodle.warwick.ac.uk/>
3. There are also numerous online courses provided by the University library to help in academic referencing, writing, avoiding plagiarism and a number of other useful resources. <https://warwick.ac.uk/services/library/students/your-library-online/>
4. Wellbeing support services <https://warwick.ac.uk/services/wss>

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1.0 Introduction

Quality Management is all about making sure that products and services which organizations offer, meet the customer demand, needs and expectations. It certainly helps organizations to maintain the high standard, improve their overall efficiency, and stay successful in the long term (Hoyle 2007). This review will cover quality management tools we discussed and presented in our class. We dove into 5 tools for process improvement, like Six Sigma, Deming's Philosophy, TQM, EFQM and ISO 9000. This review will give a simple overview of these quality management practices. In the end, a conclusion is made from this analysis, highlighting the similarities between the tools used and how they follow a similar approach.

2.0 Evaluation of Quality Management Theories.

2.1 Six Sigma

Six Sigma is a structured, data-driven method designed to improve product and process quality by reducing defects and variability. Developed by Bill Smith a Motorola Engineer in 1987, this methodology uses statistical techniques and quality management principles to boost efficiency and effectiveness (Prabhushankar, Devadasan et al. 2008). The term "Six Sigma" signals to a high-quality standard, equating to 3.4 defects per million opportunities.

The approach integrates two different tools and techniques within a structured framework, such as **DMAIC** (Define, Measure, Analyze, Improve, Control) for *improving existing processes* and **DMADV** (Define, Measure, Analyze, Design, Verify) for *developing new ones* (Schroeder, Linderman et al. 2008). Beyond statistical analysis, Six Sigma highlights the importance of strong leadership, employee participation, and a focus on customer needs.

Implementing six sigma can benefit organizations in different ways like improved quality, cost saving, reduction in waste and customer satisfaction (Raisinghani, Ette et al. 2005). However, it comes with some challenges as well, which include resistance to change from employees, more efforts and commitment from the management.

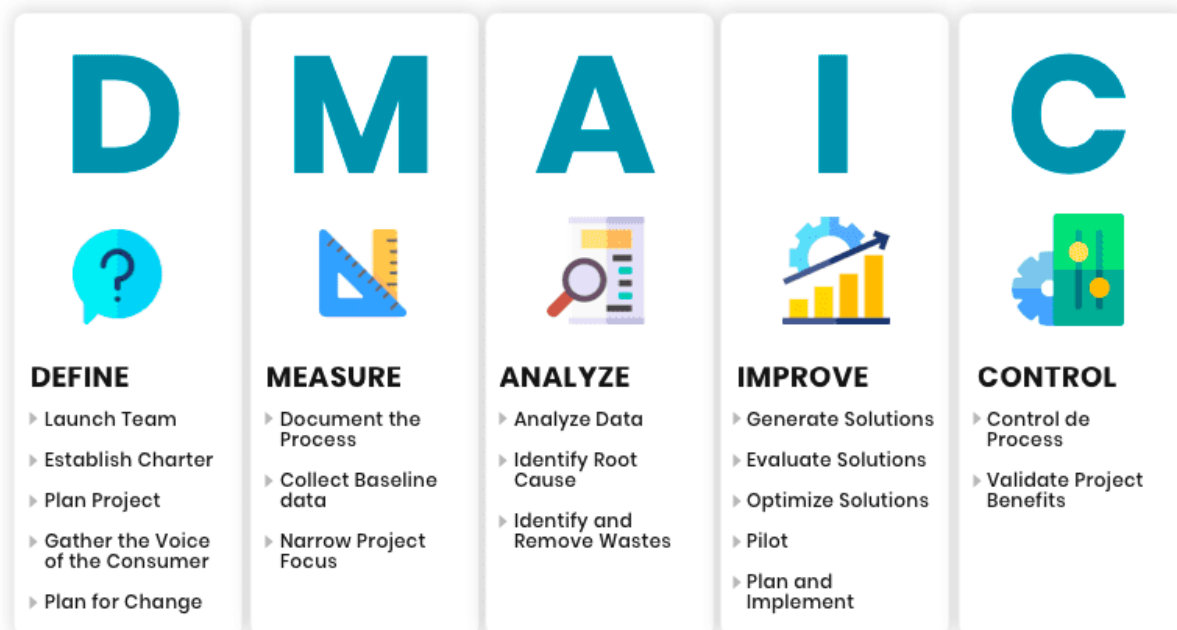


Fig. 1 – DMAIC Framework (Mall 2023)

2.2 Total Quality Management

Total Quality Management (TQM) is an integrated approach dedicated to enhancing organizational performance by improving quality. It is a philosophy that highlights continuous improvement in manufacturing through waste minimization, quality advancement, skill enhancement, and cost optimization. TQM is essential for gaining a competitive edge and is based on key principles that organizations need to apply in all areas of their operations (Jumady, Sugiarto et al. 2021). As can be seen in fig.2 the TQM Pyramid has four sides and a foundation. It shows how different levels of an organization work together to manage and improve quality. It mainly focuses on continuous improvement of process, focus on customers, focus on facts and everybody's participation.

Implementing Total Quality Management brings several benefits to organization which includes, better customer satisfaction, reduced rework and higher productivity (Polat, Damci et al. 2011). Despite of having these benefits, TQM comes with several barriers as well which are, lack of visible commitment, insufficient training and resistance to change and requirement of resources (Al-Jalahma 2012). This limits the spread of TQM as a quality management tool.

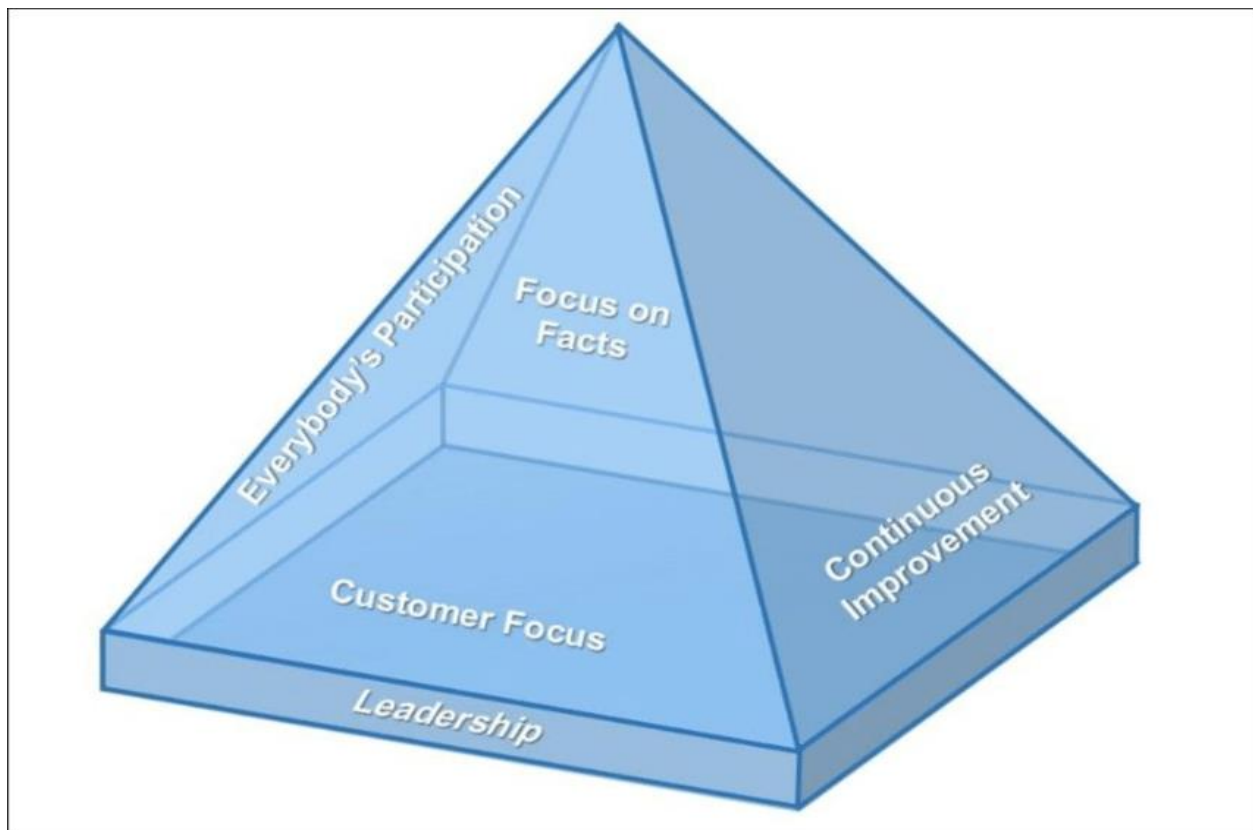


Fig. 2. The TQM Pyramid (Shoshan 2016)

2.3 Deming's Philosophy

"Dr. W. Edwards Deming taught that by adopting appropriate principles of management, organizations can increase quality and simultaneously reduce costs (by reducing waste, rework, staff attrition and litigation while increasing customer loyalty). The key is to practice continual improvement and think of manufacturing as a system, not as bits and pieces" (Deming 1991). This philosophy helps organizations to focus on efficiency, customer satisfaction and quality.

Deming's 14 Points – These 14 points are meant to help the management stay committed to quality by improving how processes are designed and controlled. They use tools like statistics to monitor performance, constantly looking for fixing quality problems (Metri 2006). Below are the 14 points of Deming's Philosophy.

1. Create Consistency of Purpose
2. Adopt New Philosophy
3. Cease Dependence on Mass Inspection
4. End the Practice of Awarding Business on Price Tag Alone
5. Improve the System of Transport Service
6. Institute Training
7. Institute Leadership
8. Drive out fear
9. Breakdown Barriers Between Departments
10. Eliminate Slogans, Exhortations, and Targets for the Workforce
11. Eliminate Numerical Quotas
12. Remove Barriers to Pride of Workmanship
13. Encourage Education and Self-improvement for All Employees
14. Act to Accomplish Transformation

The PDCA Cycle – It is also known as the Deming or Shewhart cycle. The PDCA cycle is a method used to improve processes through a continuous loop of planning, doing, checking, and acting (Pietrzak and Paliszkievicz 2015). Each step in the Plan-Do-Check-Act cycle helps identify which business processes are effective and which need improvement.

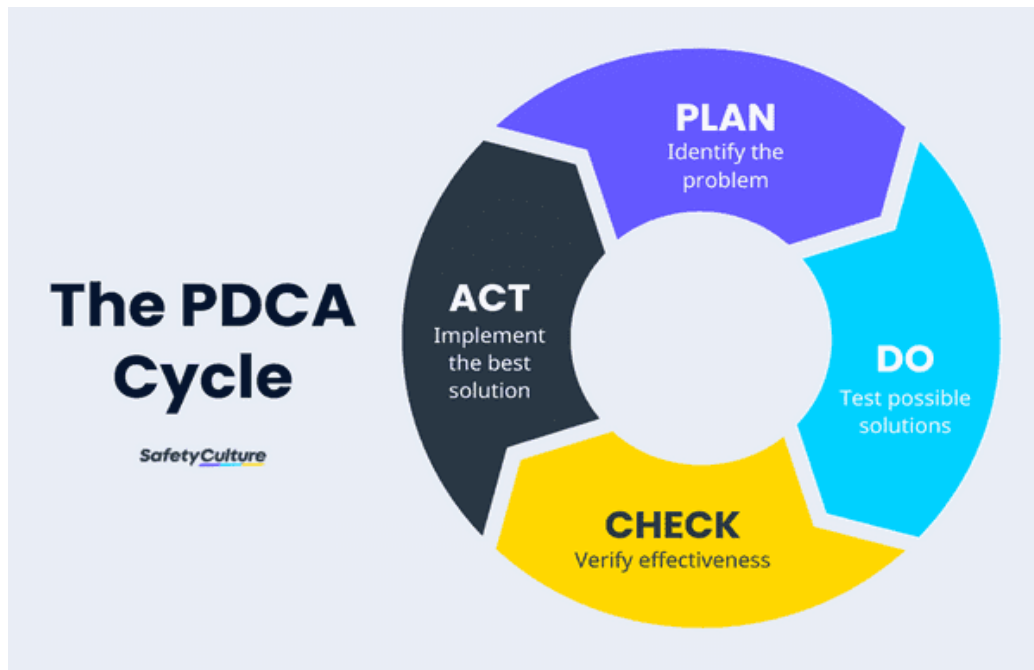


Fig. 3. The PDCA Cycle (Reyes 2024)

2.4 EFQM

The European Foundation for Quality Management (EFQM) model is a framework made up of criteria that represent key areas of an Organization. It includes nine criteria, further divided into 2 groups **enablers** and **results**. Enablers focus on what the organization does like leadership, people, policy and strategy, partnerships and resources, and processes. While results focus on what the organization achieves, outcome for the employees, customers, society and overall business performance (Ruiz-Carrillo and Fernández-Ortiz 2005). This model helps organizations improve their operations and achieve sustainable success by identifying strengths and areas for improvement by aligning the TQM principles and stakeholder collaborations.

There are benefits of EFQM like it supports self-assessments. It also guides the TQM Initiatives, it has global adaptability irrespective of the sizes of organizations (Carlos Bou-Llusar, Escrig-Tena et al. 2005). However, there are some cons of EFQM as well. The EFQM Model can seem complicated, especially for smaller organizations, making it hard to use. Also, Using the model can take a lot of time, money and expertise which may be tough for smaller organizations (Wierzbic and Martusewicz 2019). These are some cons for EFQM model.

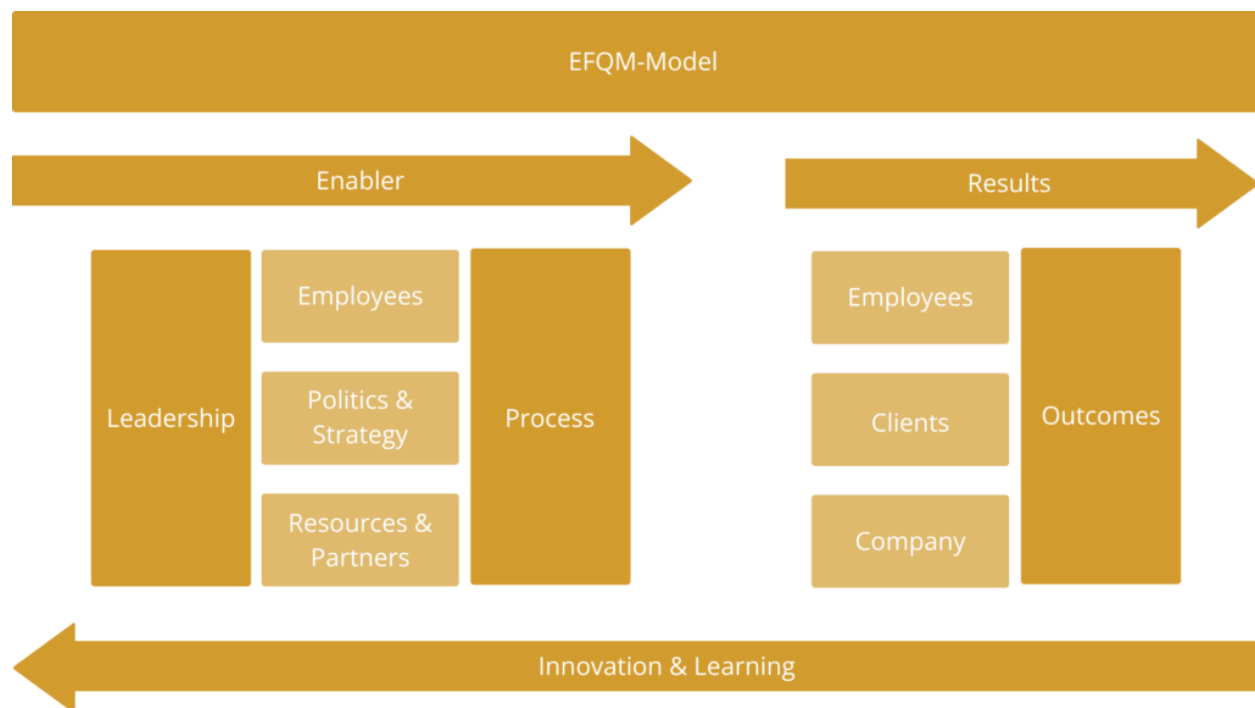


Fig. 4. The EFQM Model (2023)

2.5 ISO 9000

International Organization for Standardization (ISO 9000) is a set of international standards that help organizations to manage quality. It ensures that, they meet customer demands, needs, and follow regulations and improve their processes. The system focuses on important ideas like ***keeping customers first, good leadership, teamwork, constant improvement, using data to make future decisions and building strong relationship***. By following these guidelines businesses can improve their quality, work more efficiently and stay competitive (Koc 2007). Receiving ISO Certification shows that a company meets the quality standards, which can improve the organizations reputation and market value. However, some businesses find the certification process costly and may not immediate benefits like reduced costs and better performance (Sun 2000). Overall, ISO 9000 helps organizations to enhance quality and customer satisfaction.

The ISO Certification can offer organizations a credibility boost and can give a competitive edge and advantage. Also, it can be used for enhancing organizations reputation which brings new opportunities. Meanwhile, Certification and maintaining compliance can be expensive, especially for smaller organizations. As well as there are buyers who really don't care about the ISO certification.

Core Standards in ISO 9000 Series (Rogala and Wawak 2021) –

- **ISO 9000** - Explains the basics and terms of quality management systems to help organizations maintain quality.
- **ISO 9001** - Lists the rules for delivering consistent products and services that meet customer and legal requirements.
- **ISO 9004** - Gives tips for long-term success by improving quality and building strong relationships with stakeholders.

3.0 Conclusion

In conclusion, Six Sigma, TQM, Deming's Philosophy, EFQM, and ISO 9000 all aim to improve quality, customer satisfaction, and efficiency of an organization. They share some common principles like employee involvement, continuous improvement, customer satisfaction and using data to make decisions. However, they differ in their focus and methods. Six Sigma uses data and statistics to reduce defects, while TQM focuses on reduced rework and higher productivity. Deming's Philosophy highlights the importance of the PDCA Cycle to improve the process through a continuous loop. Whereas, EFQM promotes overall excellence in all areas including performance, efficiency and sustainability. ISO 9000 provides a clear framework for quality assurance, customer trust and reduced cost of the product. Despite of these differences, all the tools help organizations improve and achieve long-term success. Choosing the right tool depends on the organization and its requirements.

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