7. PROJECT GUIDELINES

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7. PROJECT GUIDELINES

A requisite part of the study programme is an **industrially oriented project** which comprises 50% of the assessed marks for the MSc Programmes. Participants are expected to devote an appropriate portion of their time and intellectual effort to the project during the course i.e. **A TOTAL AMOUNT OF TIME EQUIVALENT TO 6 MONTHS FULL TIME STUDY**.

The individual project final report is submitted in the form of a dissertation. For the MSc courses a dissertation is defined as follows:-

> "A dissertation submitted in part fulfilment of the requirements for the award of a Masters degree shall constitute an ordered critical and reasoned exposition of knowledge in an approved field and shall afford evidence of knowledge of the relevant literature, and be submitted in accordance with the appropriate course regulations."

For the WMG MSc programmes, the dissertation is expected to be comprehensive report embracing technical, economic and human aspects of engineering industry and their interaction. The topic of your research **must be relevant to the degree for which you are registered**.

Information on the requirements for the project for your specific course can be found under the **Requirements** link of the **Projects** section of the course website at https://warwick.ac.uk/fac/sci/wmg/overseas/hk/projects/requirement and are:

For the MSc in **Engineering Business Management** the project should normally be related to the management of:

- companies in the engineering sector,
- the engineering function within a non-engineering company *or*
- the supply chain within the engineering sector.

The project could address many different aspects such as operational, financial, human resource, technical or strategic management issues. Where the project is of a technical nature, there must be clear evidence of business benefit from this technology. If the focus of the project is outside the above industrial spectrum it MUST contain considerable comparative analysis of practices in the engineering sector.

For the MSc in **Manufacturing Systems Engineering and Management**, the project should relate to product or process technology, operations or management within a manufacturing context.

For the MSc in **Supply Chain and Logistics Management**, the project should relate to a logistics related topic e.g. purchasing/outsourcing, material/production control, inventory reduction, material flow, warehousing and distribution, supply chain management or transport planning.

Normally, project selection should be done by the end of the first year of registration for full-time participants and at the beginning of the second year of registration for part-time participants. The project must be approved by the University and it must be equivalent in effort to a minimum of ninety units of credit.

An academic supervisor will be appointed to monitor each project. The project and dissertation will be assessed separately from the modules.

Advice on project proposal/selection, ethical approval of research, time management and other guidance information is available on the programme website: https://warwick.ac.uk/fac/sci/wmg/overseas/hk/projects.

All students completing a project will be required to complete an ethical approval application form. Data MUST not be collected without first obtaining ethics approval for your research, or this being formally waived for your project. If you submit a project that includes data gathered from or about people without ethical approval this may be treated as academic misconduct and could lead to a mark of zero being awarded for your project.

Prior to commencing research on your project, you should also complete the following two online courses:

- Information Security Smart (compulsory):
https://moodle.warwick.ac.uk/course/view.php?id=49636

You should attach a screenshot evidencing your completion of the course to your ethical approval application form.

- Epigeum online research integrity training course (concise/short version):
https://warwick.ac.uk/services/ris/research_integrity/trainingandmentoring/online-training

(link provides information on how to access the course)

When completing the Supervisor Delegated Ethical Approval (SDA) form for ethical approval of your project, you should insert the date you completed the Epigeum course.

See https://warwick.ac.uk/fac/sci/wmg/overseas/hk/projects/ethicalapproval for further information on the approval process.

Note THE PROJECT, DISSERTATION AND ORAL EXAMINATION CONTRIBUTE 50% OF THE CREDIT TOWARDS THE DEGREE OF MSc.

7.1 Project Guidelines for MSc Part-time Participants

7.1.1 Identify a Suitable Project

During your first year of registration on the MSc course you should **identify a suitable topic to form the basis of your project and dissertation.** This should be done in consultation with your Managers and your Company Training Department.

Your project topic can be selected from a wide spectrum of technical and engineering/process business subjects, however, choice may be constrained by your own company policy. For the Warwick Manufacturing Group MSc programmes, the dissertation is expected to be comprehensive report embracing technical, economic and human aspects of engineering industry and their interaction. The topic of your research **must be relevant to the degree for which you are registered**.

The title of your degree programme is important to you and your employer. As a substantial part of the work is the project it is clear that this should reflect the main theme of your programme of study. It is not intended that your project should be solely on that theme, only that it should be central to the work. There have been occasions when participants have not complied with this and their degree has not been awarded. Please take care during the project selection process.

In all cases the dissertation should be an exposition of your work and ideas. Where others have had an input (e.g. in a teamwork situation) this should be clearly identified. Since the subject areas of dissertations can be so diverse it is impossible to define a standard approach to content. However, this should include an introduction and definition of objectives, a literature survey, and a review of the problem followed by a description of your approach to solving the problem, your results or findings, an intellectual analysis of your results or findings and, finally, a logical review of the conclusions you have drawn.

Advice and guidance on company policy should be sought from your manager whilst advice on the University requirements and suitability of topics can be sought from staff at the local IGDS office or Mr. Mike Newton, Director of Overseas Programmes, University of Warwick (+44 24 7652 3910, email J.M.Newton@warwick.ac.uk).

7.1.2 Identify a Suitable Industrial Supervisor

Having selected a subject area for your project it is your responsibility to find someone who is prepared to act as your **Industrial Supervisor**. The role of the Industrial Supervisor is as follows:-

(i) To monitor progress on the project over a period normally of 1 to 2 years in order to be able to assess effort, competence and comprehension.

(ii) To liaise with the Academic Supervisor to ensure that the project is directed so as to be industrially relevant and academically suitable.

(iii) To read and assess the completed written report with regard to quality, content and presentation.

(iv) To jointly (with the Academic Supervisor) conduct an oral examination to assess overall breadth and depth of knowledge.

The Industrial Supervisor should be a suitably qualified, senior individual within the company who has a knowledge of the circumstances surrounding the project and who can judge the relevance of methods used and conclusions drawn in relation to normal company practices and current and future business objectives.

Since the Industrial Supervisor is responsible for deciding marks which affect the awarding of a degree, the University stipulates that the Industrial Supervisor should meet the following requirements:-

(a) The person should normally have a degree or an equivalent professional qualification.

(b) The person should occupy a significant position of authority and responsibility.

(c) The person should have a significant awareness of the project and be in a position to assess an individual's performance on the project.

Points (b) and (c) above normally mean that an Industrial Supervisor should be in a fairly senior position but not so senior as to be remote from the detail of the project. As a guide, supervisor is usually 1 to 3 levels higher than the Participant within the management hierarchy. Advice may be sought from the training department concerning suitable supervisors.

You should approach a prospective supervisor and should explain your requirements with the aid of "Information for Industrial Supervisors", issued with this note. You should obtain

agreement on the content of the project and the supervisor agreement to fulfil the role outlined above.

If you have problems identifying a suitable person within your organisation to act as an industrial supervisor, you should consult with the local Director of Studies. They will be able to advise you and, if necessary, suggest someone outside your own company who could act as a supervisor.

7.1.3 Submit Your Project Proposal

Having identified an Industrial Supervisor you should, with their agreement, write a brief synopsis of your project proposal headed with your name, your Industrial Supervisor's name, contact addresses and phone numbers together with your Industrial Supervisor's qualifications and company position. This should be followed by the project title and a clear statement of the objectives of the project and the way in which you will satisfy these objectives. **A standard form for the project proposal** is included with these guidelines.

After clearing the proposal with your company you should **send the proposal to the Director of Studies at the local IGDS office**, before the deadline.

Your proposed topic will be considered along with your nomination of an Industrial Supervisor. If both are acceptable a suitable **Academic Supervisor** will be appointed and you will be notified by post and asked to contact both supervisors to arrange an inaugural meeting.

If the project proposal is unacceptable you will be asked to submit a new one, or revise the original.

NOTE: If you have not proposed a suitable project by the end of your second year of registration, you will be considered by a Board of Examiners with a view to down-grading your registration to the Postgraduate Certificate (for which no project is required). Should your registration be down-graded, and the Post-graduate Certificate later awarded, you would NOT be eligible for advanced credit standing in a subsequent MSc registration.

7.1.4 Meeting Your Supervisors

The initial tripartite meeting to discuss your project could ideally be arranged at your place of work so that your Academic Supervisor can become acquainted with the environment in which the project is to be conducted. The meeting should allow the project to be discussed thoroughly, for all parties to resolve any outstanding questions and to specify project mile stones and agree a timetable for their achievement. It is useful at this stage to discuss proposed chapter titles and contents to give both supervisors a feel for the extent of coverage and depth of the planned work.

Following the initial meeting, the **Participant should regularly report progress to the Supervisors**. In the event of a major problem a tripartite meeting should again be initiated: e.g. if the direction of the project has to be changed as the result of new findings or a change occurring in company circumstances, etc. Regular liaison with the Academic Supervisor is advisable in order to ensure the project attains a suitable academic content and tripartite progress meetings are encouraged.

7.1.5 Progress of the Project

You should **aim to have gathered all the necessary information to complete the project by the end of the second year of registration**. This should include a **literature survey** in the chosen area of your project. The literature survey can be carried out through your company Library or elsewhere. Advice on literature searches can be sought from your Academic Supervisor or from your local IGDS office staff. On-line computer searches can be carried out at good libraries whilst a large number of Abstract Journals are also available for manual searches. Texts or papers identified in this way may be held in and borrowed from the library or may be borrowed through Inter Library Loans. For guidance on referencing your literature, see the earlier section of this handbook (Introduction to the MSc).

You should **plan a timetable for "writing up" your dissertation** starting at the end of your second year of registration with a planned completion date well in advance of the end of your registration period. **You should submit, in draft form**, a substantial portion of your dissertation - for instance the introductory and literature survey chapters together with the proposed page of contents, **to your supervisors to make comments** on the content, structure, style and presentation of the dissertation and allow you to incorporate their suggestions into subsequent chapters. You are encouraged to continue submission of all of the chapters of your dissertation in draft form prior to finalising to ensure that the dissertation adequately reflects the quality of your efforts on the project.

During the last year of registration careful time management is essential. You are encouraged **to plan to submit your dissertation well before your end of registration period i.e. several months**. This will allow for unforeseen problems such as minor illness, rewriting draft chapters, typing delays, typing corrections. In particular you should liaise with your supervisors regarding their availability to carry out the proof reading task during this period. Experience has shown that the **submission of your dissertation in draft form to supervisors for comment is a valuable practice in achieving a high quality of presentation and content.**

Allocation of time and facilities for project work is at the discretion of the individual company but there are minimum commitments expected to ensure that participants are enabled to successfully complete the project and dissertation requirements within the allotted time span. The Training Department should advise the participants and their managers as to the degree and form of the Company commitments.

7.2 Project Guidelines for MSc Full-time Participants

7.2.1 Time Management

In order to allocate 50% of your effort to your project you should allocate, on average, alternate weeks to project and coursework. You should prepare a plan of work for your project as soon as possible after it is allocated taking into account module schedules and the requirement to submit post module work.

Due to the continually assessed nature of the courses it is essential that you manage your time effectively throughout the year. To this end you are encouraged to plan your work schedule in a diary or calendar and adhere as closely as possible to this during the year. In particular you should allocate NO MORE THAN ONE WEEK to each piece of post module work. The time allocated to post module work should not be allowed to encroach on the time slots you have allocated to project work.

7.2.2 Project Selection

At the start of your period of registration a list of individual project titles which have been proposed by members of PolyU Staff or by collaborating companies will be issued. These

will provide a wide range of topics to choose from. During the first few weeks of your registration you should identify those projects which seem of most interest to you. You should then obtain more in depth information concerning each of these projects by approaching the member of Academic Staff who has proposed the project and by attending any relevant seminars, etc. that may have been arranged. If any such project is not available you are advised to attach yourself to any industry of your choice or you can request BATC to place you in some industry for carrying out your project.

If you or your sponsoring company have a particular interest which falls within the industrial subject area, but which is not represented in the project listing, then you should contact the Projects Manager with your alternative project proposal. This should include the proposed title and a synopsis of the content and proposed approach. The Projects Manager will then consider your proposal and advise you as to its suitability. He will assist you in identifying an appropriate member of staff who would be prepared to act as your Supervisor. Please note that your own project proposals will only be considered BEFORE the general project allocation procedure begins.

During your first month or so, you need to seek out the supervisors of the projects in which you think you might be interested, gain further information from them about the project and ascertain the method by which they plan to select the student to undertake their project. You should note that the selection process is two-way; supervisors are selecting project students as well as students selecting projects. To assist supervisors in their selection process, they may ask for written information to support your application.

7.2.3 Project Progress

At your inaugural project meeting with your Supervisor you should discuss overall project objectives and agree a timetable to meet those objectives based around your other course work loadings. It should be stressed that the marking of your individual project will not only be based upon the quality of your dissertation and your performance at the oral exam but will also have an element based on your progress on the project throughout the year. It is therefore essential that you should plan and progress the work effectively and also maintain regular contact with your supervisor to keep him/her informed of your progress and to seek his/her guidance and advice.

7.2.4 Supervision Expectations

There are various things that you can expect from a supervisor (industrial or academic), and various things that he/she will expect from you. What follows is an indicative list, which we suggest you discuss with your project supervisor(s) early in the course of your study so that both are clear on what to expect.

Responsibilities of Student:

- Discuss with your supervisor the type of guidance and comment you find most useful and agree a schedule of meetings for your period of study
- Provide your supervisor with your schedule of modules and inform him/her of any changes as they arise, so he/she may assess your progress in the light of these other commitments
- Over the course of the year be prepared to devote approximately 990 hours to the application for, execution and documentation of your project and preparation for the oral examination.
- Take the initiative in raising problems or difficulties however elementary they may seem
- Maintain the progress of the work in accordance with the stages agreed with the supervisor, including, in particular the presentation of written material as required in sufficient time for comment and discussion before proceeding to the next stage
- Clear with your supervisor, in advance, any external correspondence relating to your project
- Adopt at all times, safe working practices and adhere to the University and Departmental Safety Guidelines
- Attend any seminars provided to assist you in carrying out your research or presenting it appropriately

You need not confine your requests for advice to your supervisor(s) and you are encouraged to approach anyone who can help. You should, however, keep your supervisor(s) informed of who else you have been discussing the work with.

Responsibilities of Supervisor(s)

- Provide advice and guidance to potential candidates for the project during the project selection stage
- Maintain contact with you through regular tutorial meetings, to ensure the meetings are largely uninterrupted and to make appropriate alternative arrangements when he/she is working away
- To be accessible to you at other appropriate times when you may need advice on academic and personal matters
- To inform you of when he/she will be away for any extended period of time so you may plan accordingly
- To give guidance about the nature of research and the standard expected, about the planning of research, about literature and sources and about requisite techniques (including arranging for instruction where necessary)
- To ensure that the correct safety procedures are followed if you are working with dangerous equipment or materials
- To give detailed advice on the necessary completion dates of successive stages of the work so that the whole may be submitted within the scheduled time
- To make you aware of forthcoming events which would benefit your development
- To request written work as appropriate and return such work with constructive criticism and in reasonable time
- To ensure that you are made aware if either your progress or the standard of your work is unsatisfactory and arrange any necessary supporting action
- To submit a report to the Programme Management on your progress in the spring and summer if applicable
- To encourage and assist you to publish the results of your work if appropriate
- To be willing to provide references to future employers, if requested

Please note that it is the duty of your supervisor(s) to help you carry out research and to present your results to the best advantage. However it is YOUR work, not your supervisor's, that will be examined and your supervisor's agreement to the submission of your dissertation is not a guarantee that the examiners will deem it satisfactory.

Submission of Your Dissertation

You should submit an electronic copy of your dissertation to Tabula by your submission deadline. The University accepts the date and time of the electronic submission as the formal submission record.

The end of registration period is normally 3 years after the date of an initial registration as a part-time student whereas a full-time student is required to complete the programme within 1.5 years. Extensions of registration periods are exceptional and are granted only in special circumstances such as prolonged periods of ill health or significant secondments abroad in the discharge of your employment duties**. To apply for an extension** a request in writing must be made (see section on **"Dealing With Problems"). This must be supported and confirmed as reasonable by separate letters from your project supervisors.** Your request will be considered by the executive committee and if deemed appropriate representation on your behalf may be made to the Board of Graduate Studies with a request for extension to the registration period.

Project Examination

After submission of your dissertation you should make arrangements at a convenient time and place **for a presentation and oral exam** at which you and both your Academic and Industrial Supervisors should be present**. The date set for the oral exam** should allow both supervisors sufficient time to read the completed dissertation, and **should be within one month after the submission of the dissertation**.

During the Oral Examination you will be expected to demonstrate a thorough understanding of the topic covered by your dissertation and to justify the arguments you have used and the conclusions you have drawn in the dissertation.

After the Oral Examination your Examiners will allocate marks for project progress, standard of the dissertation/report, and your performance in the oral exam. The allocation of marks to these categories will be guided by the following resume of points. The weighting given to each individual point may vary depending on the nature of the project.

Oral Presentation

Marks will be awarded for the dissertation element of the project ONLY; the candidate will, however, be required to pass the oral element (on a Pass/Fail assessment only). The oral presentation is designed to allow the candidate to demonstrate the following:

Assessment Level	***Oral Component Descriptor***
Pass	The candidate demonstrated an understanding o the work presented and was able to answer questions on both the work presented and on the subject areas in general and defend the work undertaken and its suitability for the degree in question.
Fail	Showed an incomplete understanding o the area of work and general difficulty in handing questions without help. Was not able to convince the assessors that the work presented was that of the candidate.

Project Report

Your project is assessed against a set of criteria. The relative weighting of the different criteria will depend on the research context. For example a project which is essentially literature based will have greater weighting on the criteria relating to literature, whereas a project for which there are few appropriate alternative research methods would not have as great a weighting on the research methods criteria as others. It is up to your assessors to decide what weighting is applicable for a particular project since due to the wide diversity of WMG.

It is recognised that in some project areas, limited peer reviewed academic literature will be available. This lack of academic literature indicates a lack of theoretical knowledge in that area, as peer reviewed academic journals are principally publishing new theoretical knowledge. Therefore, some project subjects lack relevant theory and the methodology needs to acknowledge this and progress using other data sources, such as commercial literature and information, to build conceptual frameworks. The term "literature" as used in the criteria should therefore be interpreted as source material appropriate for the area for study. In all cases clear indication of awareness of and allowances for possible biases and inaccuracies are be expected since it is a basic principle that the reliability of any source used will be discussed and that if a source is unreliable then a statement of how that affects the use of that source should be made. All dissertations should have appropriate referencing (i.e. non-trivial, focussed and relevant from sound sources). Although there are no specific

requirements for the number of reference sources, it is expected that this would be sufficient to validate the authority of the points being made.

The concept of research methodology mentioned in the criteria is related to the rigour of the approach to the research undertaken. In every case, for theoretical academic, experimental, business creation or practical industrial problem solving type dissertations the rigour of the work carried out is paramount and hence needs to be justified and explained with recourse to supporting literature or other evidence for choices made. The methodology is the detailed description of what is to be done to carry out the work and why it is done in that way. Note there is no requirement for there to be a discussion of broader issues around research philosophies or strategies.

It is an overriding requirement that the project is suitable for the degree being studied. Although this is not defined in the assessment grid below it is not possible to obtain a pass in a course where the project does not meet the requirements of that course. Project specification for each course can be found in these marking guidelines and on the web site (https://warwick.ac.uk/fac/sci/wmg/ftmsc/project/requirement/).

The concept of project risk as applied in the criteria is focused on the work that needs to be done to deliver the objectives. For example the use of a survey is high risk, since there may be few replies, questions may be misunderstood or not answered etc., so how you have planned to deal with that risk in your methodology, how you have planned to mitigate or recover from it occurring. For example if you do a survey which has insufficient responses there maybe a number of possible options; repeat the survey, drop the survey and do something else, most likely literature based or to use the survey data but in the analysis allow for the low survey numbers by choosing appropriate analysis techniques and talking about confidence in results etc. With these options, you will have to plan to choose one (or more) and justify that choice.

Note also that the presentation will impact on the mark awarded, the majority of the mark will represent the content rather that the document's structure. The descriptors below represent the middle of the band, so, for example, the descriptors in the 70-79 column, represent the marks of 75%.

Informal feedback will be provided after the examination. However, all decisions are subject to Examination Board approval.

Criteria	***80+***	***70 -79***	***60 – 69***	***50-59***	***40-49 May be re-assessed for Pass/Fail against PgDip 60 credit project learning outcomes at resubmission***	***30-39 Resubmission of first attempt normally allowed***	***20 - 29 Resubmission of first attempt MAY be allowed, usually for consideration for PgDip only***	***<20 Trivial, hence resubmission is unlikely to be permitted***
Formulate a research question and derived objectives suitable for the degree and consistent with the time and resource available to conduct the research.	The research question and derived objectives are well argued, clear and appropriate. A gap in current knowledge and understanding is likely to have been identified. Expected outcomes are expressly articulated and	The research question and derived objectives are clear and appropriate. Expected outcomes are very clear, are articulated and generally achievable with the time and resource available.	The research question is clear but derivation of the objectives may not always be obvious. Expected outcomes are clear.	Research topic is outlined and justified. Objectives are stated. Expected outcomes may be unclear.	The problem of study has been identified, with only limited research question(s) and/or objective(s).	Does not demonstrate understanding of the issues. Research question is absent or poorly expressed. objectives lacking or badly formulated.	No research question, research objective(s) unclear, confused or missing.	Inadequate or no evidence of project objectives.

	appropriate.							
	The work was perfectly scoped to have been carried out in a balanced manner in the time expected to be available	The work was scoped to have been carried out in the time expected to be available.	The work was satisfactorily scoped to have been carried out in the time expected to be available with only some minor aspects overlooked.	The work was mainly scoped to have been carried out in the time expected to be available but with minor aspects overlooked.	The work was poorly scoped to have been carried out in the time expected to be available, but with major aspects overlooked.	The work was scoped incorrectly and it would not be possible to have been carried out in the time expected to be available.	Insufficient consideration was given to the scope of the work to allow it to be carried out in the time expected to be available.	Inadequate or no consideration given to the scope of the work and the time/resources available.
Achievement of project objectives.	Project objectives irrefutably achieved. There is no evidence of incomplete work.	Project objectives have been achieved. There is no significant evidence of incomplete work.	Project objectives have mostly been achieved. There is little evidence of incomplete work.	Project objectives have been generally achieved There is some evidence of incomplete work.	Project objectives only partially met. There is evidence of incomplete work.	Some indication of limited achievement of project objectives. There is strong evidence of incomplete work.	Almost no achievement of project objectives, if any. There is very strong evidence of incomplete work.	No achievement of project objectives or project objective do not exist. Work is incomplete.
Critically evaluate the context of the research,	Shows an exceptionally well developed capacity for	Shows very highly developed ability to analyse, synthesise and	A good attempt at analysis, synthesis and application of a wide range of	An attempt at analysis, synthesis and application of knowledge and	There is a tendency towards uncritical description of the	Background work stated but not properly analysed and not applied to	Inadequate review of previous work, with little relation to any project	Trivial literature review not integrated with project objectives,

synthesising ideas from a referenced review of relevant source material.	independent thought demonstrated by an exhaustive critical analysis of the literature in the area of application and also demonstrating outstandingly skilful synthesis of disparate sources.	apply knowledge and concepts demonstrated by a comprehensive critical analysis of the literature in the area of application and also demonstrating skilful synthesis of disparate sources.	knowledge and concepts. There is appreciation of the main issues and the ability to make critical points and substantiate them.	concepts has been made. There is tendency towards to rely on easily obtained background source materials and wide use of poorly authenticated material. This material may not show full integration with the research.	literature. Literature is poorly analysed and/or unrelated to the tasks carried out.	the research task. The information or data used may have limited relevance. Showing major gaps in knowledge of the subject matter and many areas of misunderstanding and confusion.	objectives, if any. Minimal analysis, synthesis and application of knowledge.	if any and showing no analysis. Shows serious gaps in knowledge of the subject matter and many areas of confusion
	All sources are properly cited and listed and references and bibliography are distinct. Reliability of sources is	All sources are cited and listed and references and bibliography are distinct. Reliability of sources is addressed in	Sources used are correctly cited and listed but and references and bibliography are not distinct. Reliability of sources is not fully	Sources used are generally correctly cited and listed. Reliability of sources is discussed but not addressed in analysis.	Sources used are poorly cited and listed. Reliability of sources is mentioned but not addressed	Inconsistent and/or incomplete recording of sources cited or listed. Reliability of sources is not mentioned.	Limited number of sources or inappropriate and irrelevant sources used or listed.	Very few or no sources used or listed.

	addressed fully in analysis.	analysis.	addressed in analysis.					
Select and justify choice of approach taken in research (i.e. research methods) to suit the requirements of the specific research question and to consider risks in carrying out the project appropriately, applying suitable mitigations	Shows the full and appropriate selection of and the application of tools/techniques and approaches used through a rigorous research methodology. Substantive consideration of the risk associated with the project execution and substantive and appropriate mitigation has been planned.	Clearly demonstrates full understanding and appropriate application of relevant tools/techniques with a clear and well-argued methodology. Comprehensive consideration of the risk associated with the project execution and comprehensive and suitable mitigation has been planned.	Demonstrates good understanding and appropriate application of relevant tools/techniques with a clear but maybe incomplete methodological argument. Some reliance on statement of potential research methods with some discussion of their application to the research topic Clear indication of consideration of	Demonstrates understanding and application of relevant tools/techniques with an incomplete methodological argument. Over reliance on statement of potential research methods with limited discussion of their application to the research topic. Better analysis techniques may be available but are not used and those that are used do not have	There is no justified research methodology, but there is an appropriate research plan. There is limited evidence of consideration of the appropriate alternative methods and analysis that should be used. Little indication of consideration of the risk associated with the project execution and limited mitigation	The research plan is flawed and inappropriate for the research carried out. Minimal indication of consideration of the risk associated with the project execution. No indication of planning for mitigation of risk	The research plan is flawed, inappropriate or missing. Does not demonstrate the ability to appropriately apply tools/techniques and methodologies. There is no comment on the background materials used. Potential risk has not been considered or	Does not demonstrate understanding of the issues and information/data used may be irrelevant. Potential risk has not been considered or addressed.

			the risk associated with the project execution and suitable mitigation has been planned. Better analysis techniques may be available but are not used.	complete justification in the methodology. Some indication of consideration of the risk associated with the project execution and some mitigation has been planned.	has been planned.		addressed.	
Devise and perform an investigation, informed by the findings of previous workers in the field, efficiently utilising available resources and dealing with problems appropriately.	Shows a complete conceptual understanding and an outstanding level of technical competence is demonstrated. The analysis, synthesis and application of knowledge and concepts are excellent.	Shows a near complete conceptual understanding and an excellent level of technical competence. The analysis, synthesis and application of knowledge and concepts are good.	Shows a sound and thorough grasp of the subject matter, good conceptual understanding and a good level of technical competence. The analysis, synthesis and application of knowledge and	Although the work may contain some errors, it is technically competent. The analysis, synthesis and application of knowledge and concepts are competent but relatively routine.	Shows a limited familiarity with the subject matter, with some serious gaps and misconceptions. A limited level of technical competence with errors. There is little appreciation of the	Little or no evidence that concepts and theory have been understood. Limited or no attempt at analysis. There is very little appreciation of the main issues and there is very little	Lack of integration with the objectives, if any, and contains some significant errors or omissions. There is no appreciation of the main issues and there is no ability to make critical points and substantiate them.	May contain statements about previous work but there is no added value.

	Shows a highly developed capacity for independent thought demonstrated by exhaustive analysis of the area of application.	There is a complete appreciation of the main issues and the ability to make critical points and substantiate them.	concepts are competent. There is appreciation of the main issues and there is the ability to make critical points and substantiate them.	There is some appreciation of the main issues and there is some ability to make critical points and substantiate them.	main issues and there is little ability to make critical points and substantiate them.	ability to make critical points and substantiate them.		

Present findings in the dissertation with clarity, appropriately evaluating the confidence that should be placed in any findings.	Demonstrates exceptional creativity and originality in application of thought or knowledge and is suitable for circulation wider than the place where the work was carried out (for example it may be suitable for publication in a peer reviewed journal with no more than minor revisions). Discussion of all concepts used, even very complex ones, are easy to follow and	There is an excellent demonstration of creativity and originality in application of thought or knowledge that can be used more generally and in wider applications than the specific type of task studied (for example it may be suitable for publication at a conference, with no more than minor revisions). Discussion of all concepts used is easy to follow and any	There is a good demonstration of creativity and originality in application of thought or knowledge that can only be applied to the specific task studied . Discussion of most concepts used is easy to follow and any supporting arguments are easy to follow. There is good comment on the evidence and materials used in the task with possibly some	There is a fair demonstration of creativity and originality in application of thought or knowledge that can be applied to the specific task studied. Discussion of some concepts used is easy to follow, and any supporting arguments are generally easy to follow There is sensible comment on the evidence and materials used in the task and the general	There is a poor demonstration of creativity and originality in application of thought or knowledge that can be applied to the specific task studied . Discussion of some concepts used is not easy to follow and Some supporting arguments are not easy to follow. There is little discussion of the work, or its applications and	There is a very limited demonstration of creativity and originality in application of thought or knowledge that can be applied to the specific task studied. Discussion of concepts used is difficult to follow and supporting arguments are difficult to follow. There is a lack of critical reasoning and often the project objectives, (where	There is a no demonstration of creativity and originality in application of thought or knowledge that can be applied to the specific task studied. Discussion of concepts used is very difficult to follow and supporting arguments are very difficult to follow. Lack of integration between area of study and previous work, discussion	No attempt at analysis and no application of thought or knowledge. Discussion of concepts used is missing and supporting arguments are missing.

	understand and any supporting arguments are easy to follow and understand. Has conclusions which are fully justified and supported by the evidence presented, and meets the project objectives.	supporting arguments are easy to follow. The work is very well argued; all the main issues are explored and evaluated and the reasons for the conclusions are clearly indicated.	minor errors that would not have a serious effect on the outcomes which are related to the originally established objectives.	outcomes are sound and where confusion or gaps exist, they would not substantially affect the outcomes.	concepts and theory are weakly understood or there is only a poor attempt to utilise them. Conclusions drawn from the work are very limited and show no added value from the work carried out.	articulated), have been ignored or badly misunderstood. What objectives there are have been ignored or badly misunderstood.	and conclusions Contains some significant errors or omissions.	
	Recommendations for further work (where applicable) are practical, detailed and	Recommendations for further work (where applicable) are practical, and convincing, with	Recommendations for further work (where applicable) are practical and convincing, with	Recommendations and conclusions (where applicable) are practical and could be acted on.	Recommendations for further work (where applicable) are generally correct but are not	Recommendations for further work (where appropriate) are unsubstantiated.	Recommendations for further work (where applicable) are irrelevant.	No Recommendations for further work.

	convincing with clear indication that consideration has been given to additional resources required to undertake the work.	indication that resource requirements have been considered.	some indication that resource requirements have been considered.		sufficiently focussed or detailed to be useful.			
Demonstration of benefit of work undertaken.	Undeniably illustrates the generic benefits and/or, where appropriate, the industrial worth of the research carried out and the candidate's total mastery of the subject matter.	Convincingly illustrates the generic benefits and/or, where appropriate, the industrial worth of the research carried out and the candidate's mastery of the subject matter.	Strongly Illustrates the generic benefits and/or, where appropriate, the industrial worth of the research carried out and demonstrates the candidate's strong knowledge of the subject matter. .	Weakly Illustrates the generic benefits and/or, where appropriate, the industrial worth of the research carried out and demonstrates the candidate's knowledge of the subject matter is acceptable.	Poorly illustrate the generic benefits and/or, where appropriate, the industrial worth of the research carried out and only weakly demonstrates the candidate's knowledge of the subject matter.	Does not Illustrate the generic benefits and/or, where appropriate, the industrial worth of the research carried out and does not demonstrate the candidate's knowledge of the subject matter.	The industrial and generic worth of the research carried out has not been considered and demonstrates the candidate's lack of knowledge of the subject matter.	There is no industrial or generic worth of the research carried out. The candidate clearly demonstrates no knowledge of the subject matter.

7.3 Guidelines for Industrial Supervisors

7.3.1 Introduction

Part-time participants registered for an MSc degree must undertake an industrial project which should demonstrate an understanding of some of the technical, economic and human aspects of engineering business and their interaction. This project is assessed and it contributes 50% to the final marks on which the decision to award a degree is based. The other 50% derives from post-course work associated with taught modules in various aspects of manufacturing and design.

As the project represents a large amount of effort on behalf of the Participant (~ 800 hours) it is a significant undertaking. Benefit can accrue to both the company and industrial supervisor if the topic for investigation is carefully chosen. It is the intention that both the project and the resulting dissertation are of value to the company.

Participants must select a topic of their own choice and must then find within their company a person who is prepared and able to act as their 'Industrial Supervisor' during the course of the project. There is also an 'Academic Supervisor' who is a member of the University who has knowledge of the selected topic, and the monitoring and support of the project is the joint responsibility of the two supervisors. The role of the Industrial Supervisor is as follows:-

7.3.2 Role

(i) To monitor progress on the project over a period normally of 1 to 2 years in order to be able to assess effort, competence and comprehension.

(ii) To liaise with the Academic Supervisor to ensure that the project is directed so as to be industrially relevant and academically suitable.

(iii) To read and assess the completed written report with regard to quality of content and presentation.

(iv) To jointly (with the Academic Supervisor) conduct an oral examination to assess overall breadth and depth of knowledge.

The industrial and academic supervisors are responsible for equal proportions of marks for the projects. The Industrial Supervisor is required to judge the relevance of methods used and conclusions drawn in relation to normal company practices and current and future business objectives. The Academic Supervisor is required to judge the level of understanding of all principles or techniques described and the awareness of practices and processes being employed outside the company world-wide.

Since the Industrial Supervisor is instrumental in deciding marks which affect the awarding of a degree, the University stipulates that the Industrial Supervisor should normally meet the following requirement:-

7.3.3 Requirements

(1) The person should have a degree or equivalent professional qualification.

(2) The person should occupy a significant position of authority and responsibility.

(3) The person should have a significant awareness of the project and be in a position to assess an individual's contribution to the project.

7.3.4 Time Commitment

Monitoring of progress on the project should be possible without extra commitment if requirement 3 (above) is satisfied. An initial meeting is required at which all three parties meet to discuss the project thoroughly and to resolve any outstanding questions. Subsequent tripartite meetings may be initiated by any party and will normally only be to change the objectives of the project as a result of new findings or company circumstances, and to establish where best to place emphasis within the project as the various aspects become clearer. Two or three meetings during the lifetime of the project should be sufficient for these tasks. It is advisable for the Participant to regularly liaise with the Academic Supervisor to ensure that the project has suitable academic content. At the completion of the project both supervisors receive a typed and bound dissertation which must be read and assessed within 4 weeks, and an oral examination must also be held within this period. This may be conducted either at the place of work or at the University and normally lasts 2 - 3 hours.

7.4 Presentation and Typing of Dissertations

7.4.1 Typing of Dissertations

Dissertations with format of electronic documents which are accepted with: -

- Using 1.5 line spacing.
- A margin of at least 25 mm on the left hand side, 25 mm on right hand side. We recommend 25 mm top and bottom and that these latter should contain the header and footers.
- Page numbering - WMG, and many text books, recommend Arabic (1,2,3) numbering begins with the first page of the Introduction and that any preliminary pages are numbered using small Roman numerals (i, ii, iii). However, BS 4821:1990 states that all the pages should be numbered in a single sequence beginning with the title page, which should be counted but not numbered. BS 4821:1990 recommends the top outer corner of each page for the location of the page number.
- The header should contain the chapter heading.
- Character size should be not less than 2.0 mm for capitals and 1.5mm for lower-case. (e.g. 12 point font, ranging from 12 point Times to 10 point Arial)
- Each chapter should begin on a new page.

You may use of colour in electronic document.

Note, that you will be required to correct any typographical errors to the satisfaction of your examiners before the award of the degree is approved by Senate.

7.4.2 Report Structure

According to BS 4821: 1990 the recommended sequence is as follows. The items in italics may not be relevant for your project and the following sections will try to explain the items most likely to be needed in your dissertation.

Title page

Abstract or summary (one separate page)

List of contents

List of tables, illustrations, etc.

List of accompanying material (e.g. software on a disc or CD)

Preface

Acknowledgement

Author's declaration

Definitions

Body of the report divided into chapters, sections, etc.

Appendices

Glossary

List of references

Bibliography

Index

7.4.3 Preliminary Pages

Preliminary pages include everything up to the text or introduction.

The **title** should be as short as possible and reflect the focus of the research. Hussey and Hussey (1997 p.286) advise against phrases such as "An Approach to … " or "A Study of…"

The title page shall give the following information in the order listed:

1) The full title of the project and the subtitle, if any;
2) The full name of the author, followed, if desirable, by any qualifications and distinctions;
3) The qualification for which the dissertation is submitted (i.e. "in partial fulfilment for the Degree of...in....");
4) The name of the institution to which the dissertation is submitted (i.e. University of Warwick);
5) The department and/or organisation in which the project was conducted (i.e. WMG);
6) The month and year of submission.

The **summary** should not extend beyond a single A4 side, and to facilitate this, single spaced typing is permitted for the summary only. The purpose of the summary according to Hussey and Hussey (1997 p. 286) is:

- "to introduce the topic
- to describe how you did the research
- to discuss the results of what was done
- to explain the implications of the results."

The **table of contents** should list in sequence, with page numbers, all relevant subdivisions of the dissertation, including the title of chapters, sections and subsections, as appropriate; any appendices; the glossary; the list of references; the bibliography (if any); the index (if provided) and other functional parts of the whole dissertation.

The **list of tables and illustrations** should follow the table of contents and should list all tables, photographs, diagrams, etc., in the order in which they occur in the text. Photographs should be mounted on good quality paper. Photographs, maps, graphs and other statistical tables should be mounted where they appear in the text. Great care should be taken in folding maps, diagrams or tables larger than paper size.

The **preface** gives reasons for undertaking the study. For example WMG might undertake a study for a specific company and the preface would explain why the company wanted the work done.

The **acknowledgements** should be short and thank those who have helped you with your project. It is particularly important to thank any companies that have provided assistance.

You should indicate in a **declaration** any material contained in the dissertation that you have used before. If the dissertation is based on joint research the nature and extent of your individual contribution should be indicated. The declaration should immediately follow the acknowledgement under a separate heading.

Finally BS 4821:1990 distinguishes between **definitions**, that define any specific terms relevant only in this report, and the **glossary** which provides explanations of terms or abbreviations used in the report. The glossary should follow the appendices.

7.4.4 Main Body or Text of the Report

The following suggestions are based on Hussey and Hussey's chapter on writing up the project (1997 chapter 9).

Introduction

An examiner will often read the introduction and conclusions first and so it is worth remembering this when you are writing these chapters. When doing a project you almost always end up writing some chapters twice and this is especially true for the introduction.

1) Broad view of the general research area – you are trying to demonstrate how important this general area of research is to the world.

2) Explanation of how your research fits into this broad area – now you are trying to demonstrate how your research is going to contribute to this general area.

3) Specific aims of your research and research questions or hypotheses – usually under a separate sub-heading so that they stand out to the reader (and examiner).

4) Guide to the subsequent chapters – 3 or 4 paragraphs explaining the content and purpose of each chapter. Some participants have shown these on a flow chart or diagram. Do not, however, just re-iterate the contents page.

The introduction should capture the reader's attention but it should not start to discuss the actual research findings so even if you are writing it at the end pretend that you have not yet conducted the study.

Literature review

This is another section that in an ideal project would get written twice. If you are using the literature search to become familiar with the research area and to narrow down the focus for your project it will be impossible to identify which articles or authors are the most relevant until you have completed the literature review. If your project involves gathering some primary data you may find that this data when analysed changes the focus of your project and you need to return to the literature to find other research that supports or disagrees with your findings (triangulation). This suggests that you might wait until the end of the project to write up the literature review. This is not advisable for a number of reasons:

1) Making notes on the literature as you read is one of the only ways you can ensure that you properly understand and absorb what you are reading.

2) In your MSc project you are marked on progress and writing up the literature may be the only hard evidence your supervisor has of your progress. This is particularly important if you wish your supervisor to give a recommendation for upgrade from PgD to MSc registration.

Research methodology

There are various research methodologies which could be adopted, and you would do well to study those available. If you answer the following questions you should have described your research methodology.

1) What was the research subject?
2) What was the research question and how was it generated?
3) What were the intended purpose, process, logic and outcome?
4) How was the research conducted?
    a) What was the underlying research paradigm or philosophy?
    b) What research methods were used?
    c) How was the data gathered?
    d) How was the data analysed?

You might include this as part of the introduction or in a separate chapter after the literature review.

Results

In a positivistic study that collected a lot of quantitative data this will be a straightforward presentation of the results. You will start with a description of your unit of analysis and sample and the presentation of the data will involve a lot of tables and charts. In a phenomenological study it many not be possible to separate the results from the analysis and the aim will be to make sense of the data used so diagrams and illustrations may help.

Analysis and discussion

You will need to remind the reader of the purpose of the research and the research questions from the introduction and discuss how the research has or has not answered the research questions. Remember this is the chapter where you have most opportunity to demonstrate your intellectual skills. You need to be self-critical so consider how reliable and valid the findings are. What have you learnt from doing the research and what would you do differently if you could repeat it? Can you really generalise about the population based on the data that you have gathered from your sample? Have you made any sweeping

statements or exaggerated claims that could be challenged in your oral presentation? The chapter should have the following sections (based on Rudestam and Newton, 1992 p. 121):

1) An overview of the significant findings of the study
2) A consideration of the findings in light of existing research studies
3) A careful examination of findings that fail to support or only partially support your hypotheses
4) Limitations of the study that may affect the validity or generalisation of the results
5) Recommendations for further research

Conclusions

Remember that most examiners read this section after the introduction so check that your conclusions show that the aim or purpose of the project has been achieved or if it has not explained why not. Try to use some of the same key words or phrases from the introduction to show consistency. It should start with the focus on your study and broaden out to discuss the implications for this research area and for future research. The main challenge in the conclusions is to give a summary whilst avoiding too much repetition and bullet points can be very useful. In the analysis section you may have identified areas for further research but in the conclusions you could give a little detail on the possible research methodology that could be adopted. Hussey and Hussey (1997 p. 293) give the following suggestions on content: -

1. Restate the purpose of the research
2. Summarise the main points from the results and show how they address your research questions
3. Give guidance of the implications of your research, who might be affected by your findings and might the affect be
4. Do not offer new opinions
5. Identify the weaknesses in your research and the limitations of your study
6. Suggest what future research might be conducted and how your study helps
7. In the same way that you should have spent time getting the opening of the introduction right try to get a convincing ending to the report.

When considering what the implications of your research are Greenfield (1996 p. 11) provides the following possibilities: -

- You may have filled a gap in the literature.
- You may have produced a solution to an identified problem in the field. (Writing a new

software programme might help solve a particular problem.)

- Your results may challenge accepted ideas in the field (some earlier statements in the literature may seem less plausible in light of your findings).
- Some earlier statements in the literature may seem more plausible in the light of your findings.
- Your work may help to clarify and specify the precise areas in which existing ideas apply and where they do not apply.
- Your results may suggest a synthesis of existing ideas. (A literature-based project can contribute by providing a comparison of previous research.)
- You may provide a new perspective on existing ideas in the field.
- Your results may suggest new ideas, perhaps new lines of investigation.
- You may have generated some new (research) questions in the field.
- Your work may suggest new methods for researching your topic.

Appendices

Appendices can become a dumping ground for material that you can not fit into the report. Remember it is quality not quantity that counts! They can be useful for information that is too detailed or not sufficiently relevant for the main report. If the research involved gathering primary data, the appendices often contain a copy of the interview or postal questionnaire (the data collection instrument), the raw data collected such as transcript of a face-to-face interview or a listing of the computer software. Any appendix material must be referred to in the main body of the report or it will be ignored.

References and bibliography

When using the numbering or Vancouver system for recording references if you refer to the same book or article many times the reference list becomes very lengthy. If as an examiner I want to check your sources of information to verify the quality and quantity of your literature review this is very difficult to do from the reference list because of the multiple listings of the same sources.

If you have used the Harvard system the references are much shorter and contain each source listed only once in alphabetical order by originator's name. This means that there is much less need for a bibliography but it could be used to list any sources not cited in the actual report and therefore not contained in the reference list.

According to BS 4821:1990 the bibliography should list all sources consulted in preparing the dissertation in alphabetical order using the originator's name. These sources may or may

not have been cited in the report

7.4.5 Linking and Editing

When you have written each chapter you need to read the report as a whole document. Unfortunately if you have left everything to the last minute you may find that there is no time for this! However, it is surprising how much easier a report can be to read if you have found the time to do the following: -

1) Introduced each chapter with one or two sentences explaining what it contains and how it links to the previous chapter.
2) Finished each chapter summarising the key points and linking it to the next chapter.
3) Edited the document to avoid repetition of material and ensure there is a logical flow and clear structure.

7.4.6 Style of Writing

The writing style of your dissertation must include correct English grammar and spelling. In general the third person should be used (though take care to differentiate between what you have done and what has been done by others). The first person singular (I) is seldom if ever appropriate.

7.4.7 Length of Dissertation

There is no regulation length for a dissertation: normally they would be expected to be at least 10,000 and not usually more than 20,000 words long, but candidates are reminded that the dissertations will be judged on their quality and not on their length. **It should be noted that dissertations that grossly exceed the 20,000 maximum words guideline may be penalized for irrelevant content.**

In general the Supervisor will advise on the format and content of the dissertation, although if required the Projects Manager or Academic Director of Graduate Studies can also be consulted.

7.4.8 Submission of Drafts

You should plan a timetable for "writing-up" your dissertation starting around FOUR MONTHS before the last submission date, with a planned completion well in advance of this date. Early planned submission of the dissertation has several advantages e.g. this will allow time for unforeseen problems such as minor illness, rewriting draft chapters, typing

delays, typing corrections and binding and any absences of your supervisor due to holidays or work commitments.

You should submit, in draft form, a substantial portion of your dissertation, for instance the introductory and literature survey chapters together with your proposed page of contents to your supervisor at least THREE MONTHS before the last submission date. This will allow your supervisor to make comment on the content, structure, style and presentation of the dissertation and allow you to incorporate his/her suggestions into subsequent chapters. You are encouraged to submit all of the chapters of your dissertation in draft form on an interactive basis prior to binding to ensure that the dissertation adequately reflects the quality of your efforts.

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