



**GUIDELINES FOR
ACADEMIC AND FIELD SUPERVISORS OF
MASTERS AND DOCTORAL STUDENTS**

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RESEARCH • DESIGN • EDUCATION

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Section 1

Introduction

Both the MSc and PhD degrees rely on the successful completion of an **academic research project** to be **reported on in a dissertation or thesis**. For our purpose research can be defined as a systematic process of uncovering and communicating the truth about a phenomenon and/or its relationship to other phenomena.

At Da Vinci a masters degree research entails proving that first, the student can conduct research and second, that such research can be utilised in the workplace.

Doctoral research entails, first, proof of research competence (cf. masters level), and second, that such research should contribute to the body of working knowledge (including application in the work place). Research at this level is, amongst other things, characterised by the originality criterion and relevant application.

On the postgraduate research journey the student can often be compared to a visitor driving a car in, for him/her, an unknown region and the supervisor to a passenger from that region with knowledge/experience of the area, the general conditions of the road, local traffic rules and related matters. There rests a responsibility on the supervisor to guide the student to reach the destination successfully – without disempowering the student as the driver! This document summarises formal and other guidelines that should assist the supervisor in adding value to the journey not only for the student, but also for the supervisor.

Section 2

Structure of the MSc Degree

The MSc programme consists of both coursework (120 credits) and a dissertation (120 credits). A student has to pass the research proposal before progressing with the module work and submitting a dissertation for examination. The focus is on management development. The full qualification accounts for 240 credits at NQF level 9.

Coursework

To assist supervisors, especially those who are relatively new partners, the coursework components are specified in some detail to serve as reference information that should be useful as coordinates for the supervision of the dissertations. The coursework component is delivered in the form of modules with pre- and post- module assignments (PMAs). This

course work component consists of a Da Vinci component (60 credits) and a generic or custom-designed component (60 credits).

Access to the qualification

Qualification for which applying	Previous Academic Qualifications	Appropriate Work Experience (years)	Employer Support	Conditions
Master of Science (MSc MOTI) NQF 9	Relevant NQF 8 qualification	5	General	
	Not equivalent to NQF 8 qualification	7	Detailed assessment	Provisional approval on the following conditions: <ul style="list-style-type: none"> • Demonstrate an understanding at NQF Level 9 (appropriate level descriptors will be used to guide the process). • Evidence of relevant publications, presentations or relevant working experience that could be considered for Recognition of Prior Learning at NQF Level 9** • Registration for the Research Workshops • Acceptance of a Research Proposal • Successful completion of the first three modules, after which the provisional approval will be converted to full approval. In the event that a student is unsuccessful in completing the above, the student will be de-registered for the relevant programme

The Da Vinci Masters (MSc) (MOTI) (Management of Technology and Innovation) framework may look as follows:

Systems and Foundational Competencies		Credits
Self, Other and Social Context (MSOS)		10
Problem Solving, Creative Thinking and Decision Making (MPCD)		8
Management Leadership Development (MMLD)		2
Managing the Systems Way (MMSW)		12
Core Competencies		
Management of Innovation (MMOI)		10
Management of Technology (MMOT)		10
Management of People (MMOP)		8

Business Management Competencies	Credits
MVIN - Visual Intelligence	12
MLCA - Leadership Perspectives: The Leadership Challenge in Africa	12
MREF - Reverse Engineering the Future	12
MGLC - Leadership Perspectives: The Global Leadership Challenge	12
MCM - Change Management	12
Total Credits	120

Research	Credits
MDISS - Dissertation	120
Total Credits	240

MOTI module outcomes to support the writing of the dissertation

Module	Purpose and Learning Outcomes
Management of Innovation	<p>Management of Innovation is about developing and creating a sustainable end to end innovation process within the organisation.</p> <p>On successful completion of this module, students should be able to:</p> <ul style="list-style-type: none"> ☞ Demonstrate an understanding of the Management of Innovation and explain the potential thereof on their organisation; ☞ Conceptualise and explain innovation as a key business process; ☞ Access innovation barriers and enablers and develop strategies to overcome and/or enhance these in their organisation; ☞ Develop and describe a strategy to implement and embed an end-to-end innovation process in their organisation; ☞ Design a plan to develop an innovation culture and capture and drive creativity in their organisation; and ☞ Explain the role of tools and technologies such as Information and Communications Technologies in driving and supporting innovation.
Management of Technology	<p>Management of Technology now integrates technology platforms from a technology driver perspective and strategically manages these so that the best value is derived from technology applications.</p> <p>On successful completion of this module, students should be able to:</p> <ul style="list-style-type: none"> ☞ Appreciate the impact of technology on business, society and the processes of change and how it can be best integrated in the pursuit of commercial success; ☞ Assess the technological competence of the business, its competitors and best practice exemplars in relation to both the context of the people and hardware involved; ☞ Identify technology needs in the context of the key business drivers and the means to access such technology through an understanding of the research and development process; ☞ Appreciate the benefits and principles of implementation of multifunctional organisation and team working in the development and integration of technological change; and ☞ Appreciate the tools and techniques necessary to identify, assess and deliver technological change at an acceptable risk.

Module	Purpose and Learning Outcomes
Management of People	<p>Management of People expands the people performance ideas and incorporates organisational transformation as well as entrenches organisational growth and wellness concepts and applications.</p> <p>On successful completion of this module, students should be able to:</p> <ul style="list-style-type: none"> ☞ Understand key issues in the behaviour of people in a work situation; ☞ Consider various options for designing appropriate organisational structures; ☞ Be aware of the people dynamics surrounding specific organisational architecture; ☞ Understand the individual behavioural requirements for high performing structures and teams; ☞ Integrate organisational wellness strategies operationally; and ☞ Distinguish between effective transformational leadership and transactional management roles.
Managing the Systems way	<p>Managing the Systems Way develops full spectrum systems thinking and causal loop processes such that extremely powerful problem identification processes are developed. Students are able to unpack current and future integrated strategies for organisational renewal.</p> <p>On successful completion of this module, students should be able to:</p> <ul style="list-style-type: none"> ☞ Conceptualise and explain the essential components of a system and key attributes with respect to its behaviour; ☞ Demonstrate an understanding of systems through an ability to select appropriate models and develop a system's model for their organisation; ☞ Interpret the impact of interventions, like new innovations, in the context of understanding the impact on different parts of the system and the system as a whole; ☞ Use a systems perspective in analysing problems and failures; and <p>Understand the basic constructs of chaos theory and their applicability in the work environment.</p>
Research	<p>On successful completion of the Dissertation, students should be able to:</p> <ul style="list-style-type: none"> ☞ Formalise a research challenge; ☞ Understand, interpret and apply appropriate research methodologies; ☞ Write a research report; and ☞ Track business implications and benefits. <p>On successful completion of this programme, students are required to integrate all assignments to reflect an understanding of the four exit level outcomes as part of their research report.</p>
Period of Registration	
Programme	Duration of programme (years to complete)
MSc (MOTI)	4

Failing to finish the qualification/programme within the above specified time frame, students must re-register to complete such qualification/programme.

The Dissertation

The dissertation will be submitted in partial fulfilment of the award of a MSc (Management of Technology and Innovation) degree. In general, a dissertation represents an academic research report involving the application of theory, covered at least partially in the modules, to a significant work-related problem and demonstrating clear evidence of structured thought processes.

Essential elements of the dissertation include a critical review of relevant literature, research methodology and design, analysis of data/information, interpretation of the results and reporting of the preceding phases according to international conventions.

The total workload of the dissertation should be in the order of 1 100+ notional hours; which includes all work activities related to completing the dissertation. (Total of 1 100 + hours = 110 credits)

More information on the nature of the dissertation can be found in the *Dissertation_Thesis Guidelines* available from the Key Account Manager.

Section 3

Structure of the PhD

In the Da Vinci Institute of Technology Management the focus of the Doctor of Philosophy degree in the Management of Technology and Innovation is on a business management approach. The full PhD programme provides for 360 credits at exit Level 10. A student will only be allowed to progress on successful submission of a Research proposal.

The doctoral degree is an exercise in independent yet rigorous thought – whereby the elegance of meaningful business solutions is translated into path finding methods and practise supported by theory. Coached, with minimal supervision, the student creates a highly specialised solution that meets the requirements of academic rigour. The research system meets the business system and the two are seamlessly integrated. Boundaries are

defined by the student and the solution finding process becomes unique. A sufficient blend of theory and practice results in elegant business solutions that make a meaningful difference. The doctoral research process embraces change and bottom-line results.

Access to the qualification

Qualification for which applying	Previous Academic Qualifications	Appropriate Work Experience (years)	Employer Support	Conditions
Doctor of Philosophy (PhD MOTI) NQF 10	Masters Degree or other relevant NQF 9 qualification	10	General, but detailed assessment by The Institute	
	Not equivalent to a Masters degree	15	Detailed assessment by The Institute	Provisional approval on the following conditions: <ul style="list-style-type: none"> • Demonstrate an understanding at NQF Level 10 (appropriate level descriptors will be used to guide the process). • Registration for the Research workshops • Acceptance of a Research Proposal • Completion of first three modules • On successful completion of the above provisional approval will be converted to full approval. In the event that a student is unsuccessful in completing the above, the student will be de-registered for the relevant programme

The Da Vinci PhD (MOTI) framework reflects the requirements for the PhD (MOTI) qualification as registered, accredited and recorded with SAQA, the HEQC and the DHET.

Research	Programme Credits
Thesis (incorporating themes related to the management of innovation, technology and people within a systemic context; and the inclusion of a Return on Investment (ROI) discussion)	360
Total Credits for Qualification/Programme	360

Period of Registration	
Programme	Duration of programme (years to complete)
PhD (MOTI)	6

Failing to finish the qualification within the above specified time frame, students must re-register to complete such qualification.

The Thesis

A thesis shall be submitted in fulfilment of the award of a PhD (Management of Technology and Innovation (MOTI) degree. In general, a thesis represents an academic research report involving the application of theory in the field of research to a significant work-related problem and demonstrating clear evidence of structured thought processes.

Essential elements of the thesis include a critical review of relevant literature, a systemic approach to the management of technology, innovation and people in the context of field of research, research methodology and design, analysis of data/information, interpretation of the results and reporting of the preceding phases according to international conventions; and Return on Investment for self, organisation/community and the society.

Critical review of MOTI themes to be integrated in the thesis

Module	Purpose and Learning Outcomes
Management of Innovation	<p>Management of Innovation is about developing and creating a sustainable end to end innovation process within the organisation.</p> <p>On successful completion of this module, students should be able to:</p> <ul style="list-style-type: none"> ☞ Demonstrate an understanding of the Management of Innovation and explain the potential thereof on their organisation; ☞ Conceptualise and explain innovation as a key business process; ☞ Access innovation barriers and enablers and develop strategies to overcome and/or enhance these in their organisation; ☞ Develop and describe a strategy to implement and embed an end-to-end innovation process in their organisation; ☞ Design a plan to develop an innovation culture and capture and drive creativity in their organisation; and ☞ Explain the role of tools and technologies such as Information and Communications Technologies in driving and supporting innovation.

Module	Purpose and Learning Outcomes
Management of Technology	<p>Management of Technology now integrates technology platforms from a technology driver perspective and strategically manages these so that the best value is derived from technology applications.</p> <p>On successful completion of this module, students should be able to:</p> <ul style="list-style-type: none"> ☞ Appreciate the impact of technology on business, society and the processes of change and how it can be best integrated in the pursuit of commercial success; ☞ Assess the technological competence of the business, its competitors and best practice exemplars in relation to both the context of the people and hardware involved; ☞ Identify technology needs in the context of the key business drivers and the means to access such technology through an understanding of the research and development process; ☞ Appreciate the benefits and principles of implementation of multifunctional organisation and team working in the development and integration of technological change; and ☞ Appreciate the tools and techniques necessary to identify, assess and deliver technological change at an acceptable risk.
Management of People	<p>Management of People expands the people performance ideas and incorporates organisational transformation as well as entrenches organisational growth and wellness concepts and applications.</p> <p>On successful completion of this module, students should be able to:</p> <ul style="list-style-type: none"> ☞ Understand key issues in the behaviour of people in a work situation; ☞ Consider various options for designing appropriate organisational structures; ☞ Be aware of the people dynamics surrounding specific organisational architecture; ☞ Understand the individual behavioural requirements for high performing structures and teams; ☞ Integrate organisational wellness strategies operationally; and ☞ Distinguish between effective transformational leadership and transactional management roles.
Managing the Systems way	<p>Managing the Systems Way develops full spectrum systems thinking and causal loop processes such that extremely powerful problem identification processes are developed. Students are able to unpack current and future integrated strategies for organisational renewal.</p> <p>On successful completion of this module, students should be able to:</p> <ul style="list-style-type: none"> ☞ Conceptualise and explain the essential components of a system and key attributes with respect to its behaviour; ☞ Demonstrate an understanding of systems through an ability to select appropriate models and develop a system's model for their organisation; ☞ Interpret the impact of interventions, like new innovations, in the context of understanding the impact on different parts of the system and the system as a whole; ☞ Use a systems perspective in analysing problems and failures; and <p>Understand the basic constructs of chaos theory and their applicability in the work environment.</p>

More information on the nature of the thesis can be found in the Dissertation_Thesis Guidelines from the Research Office.

Section 4

Supervisor(s) and Student

Appointment

Each student has the support of two supervisors; namely:

A Field supervisor, identified and nominated by the student, but approved by the Research Committee based on the following criteria:

- While it is not essential, field supervisors should preferably have a relevant degree at masters level (for masters students) or a PhD (for PhD students).
- The ability to identify and promote the application of the research and its findings to the work environment and in this way, in effect, facilitating the dissertation/thesis quality and relevancy process.
- A prominent position of authority and responsibility in the work environment.
- Have attended a one-day workshop on effective supervision.
- Should have shown significant awareness of the technical and managerial aspects of the project within the context of the work environment, and be in a position to assess the contribution of the student to the project.

An Academic supervisor, appointed by the Research Office, based on the following criteria:

- Hold at least one appropriate masters or a doctoral degree to supervise MSc students and a PhD degree to supervise PhD students.
- Have particular expertise in the field of the dissertation/thesis.
- Preferably has already supervised at least two masters or PhD students successfully.
- Undertake to apply the relevant Da Vinci theoretical paradigms, methodological, supervision, dissertation, thesis and ethical guidelines.

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- Have attended a one-day workshop on effective supervision.

Functions and roles

Field Supervisors

The field supervisor is responsible for:

- Jointly, with the academic supervisor, monitor and support the student.
- Guide the student in terms of technical, managerial, and other general aspects, without doing the work.
- Liaise with the academic supervisor to ensure the project is adequately directed with respect to its industrial relevance.
- Monitor progress in order to assess effort, competence and comprehension.
- Facilitate or promote the implementation of the findings of the dissertation/thesis.
- Read and assess the completed dissertation/thesis, in terms of the Da Vinci guidelines as provided.
- Conduct, with the academic supervisor, an oral examination in accordance with the guidelines.

The above functions will require the following time commitments:

- Initial meeting between the student, field, and academic supervisors to ensure the research is viable, meets the academic and industrial requirements, and the necessary resources are available – 1 hour.
- Subsequent three-way meetings, if necessary – usually only the first is required.
- Student meeting with the field supervisor to discuss his/her ideas, progress, problems – depending on the student –approximately one hour per month.
- Assessment and feedback to the student during research period – 15 to 20 hours.
- Assessment of dissertation (not applicable for thesis) on submission – 8 hours.
- Oral examination – 2 hours.

Academic supervisor

The academic supervisor is appointed by the Research Committee and serves as the 'accountable' entity with regard to the scientific process and quality of the research and would normally add value to the dissertation/thesis through the functions listed below:

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- Serves as key communication node with regard to all matters relating to the progress of the student and project between Da Vinci, namely, the Research Office and Key Account Manager on the one hand and the student on the other.
 - Guide the student in terms of the required technical, project management and academic requirements of the project, without doing the work.
 - Liaise with the field supervisor to ensure the project is adequately directed in respect of its academic and industrial quality and relevance.
 - Monitor progress, assess effort, competence and comprehension, as well as provide the student with feedback on submitted sections of the draft dissertation/thesis.
 - Read and assess the completed dissertation/thesis in terms of the Da Vinci guidelines.
 - Assess professional relevance of the research.
 - Conduct, with the field supervisor, an oral examination in accordance with the guidelines.
 - Support the student in writing and publishing a research article in collaboration with the Research Office.
 - Normally, a supervisor will spend approximately 40 to 60 hours (including face-to-face, e-mail, etc.) per student in the course of the life-cycle of a dissertation/thesis project.

In summary, the supervisor's contribution is normally of such nature that publications (journal articles, conference papers, etc.) resulting from the dissertation/thesis would acknowledge the supervisor as second author.

Student

Although it is rather obvious, it is necessary to emphasise that the student is the owner of his research and key role player in the research and innovation journey. It follows that the main responsibility for his/her progress and reaching the destination (of an MSc and PhD degree) lies with him/her. The following properties normally characterise the functions, role and responsibilities of a post graduate student:

- Primary responsibility for initiating and completing all phases of the dissertation/thesis project.
- Commitment to learning, discovery/innovation and productivity.
- Dedication and commitment to the research project, including the theme, design and project management plan.
- Honouring of all agreements with the supervisors.

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- Regular feedback to all stakeholders (field supervisor, Key Account Manager/Research Office and employer).
 - Managing work, personal and social life knowing that sacrifices will be made over the short term!

Research Office

The research division will ensure that

- the student, academic and field supervisor have all the necessary guidelines, marking schedules, etc. via the Key Account Manager.
- Will intervene when and where necessary if challenges are experienced during the research process.
- Act as link between the three parties where and when necessary.

Launch of dissertation and thesis process

The dissertation and thesis process is initiated when the student submits a research proposal. The research proposal is reviewed by the research workshop facilitator. If the proposal qualifies, it is forwarded to the Research Committee who approves the proposal, title of topic and field supervisor; and allocates an academic supervisor. The Key Account Manager of the cohort will, upon the approval of the research proposal, communicate accordingly with both supervisors and student.

The process will be launched by a first meeting between the student and both supervisors following the guidelines below:

- The student should take the initiative to organise the first meeting with both supervisors.
- The envisaged research and project plan should be acceptable to all parties in terms of its content and relevance; that it is viable and that resources are available to ensure that the student can carry out the research programme.
- All parties should commit themselves explicitly to the project plan (and eventual amendments to it).

The meeting should spend time clarifying all relevant aspects of the research design, including literature survey, critical review of the management of technology, innovation and people in a systemic way (for PhD), research methodology, dissertation/thesis

structure and any other aspects, and agree to such outcomes stipulated in the design process.

All three parties should agree to a time schedule and how the schedule will be monitored.

Student progress

The following cryptic notes may be relevant to both supervisor and student, since student progress is a key performance area at institutional and personal level, and obviously needs to be monitored – with the necessary guidance where necessary:

- All MSc students (optional for PhD students) will have completed an induction process that covers the research process and the requirements of the dissertation or thesis.
- Dissertation_Thesis guidelines will be made available to all students as part of their information package.
- Students should have designed a research project plan (including a time schedule) for their research period.
- Students who are new to the research process often need guidance in tackling some aspects of the research such as knowing where to start, how to carry out a literature search, etc.

Relationship between supervisor(s) and student

110 Credits of the MSc degree and 360 credits of the PhD degree comprise of an academic research project undertaken by the student under the guidance of an academic and a field supervisor and reported in a dissertation/thesis. This implies that the student and the supervisor(s) must work in close collaboration for the duration of the project. Experience has shown that the most productive relationships are built on the following assumptions:

- It is an evolving and dynamic relationship.
- It consists of open and committed communication (face-to-face and through e-media).
- It is built on mutual trust.
- Each party takes co-responsibility for the outcomes.

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- The relationship exists against the background of a social contract which is manifested in, among other things, the research project management plan.

The following stressors can often be found in most supervisor-student relationships:

- Professional work pressures.
 - Supervisors are sometimes allocated too many students.
 - The quality imperative requiring a dissertation/thesis to comply with international conventions on professional masters or doctoral degrees.
 - The need for full transparency of the research process and the expectations of a hyper-critical research and innovation community 'out there'.
 - Ethical considerations with regard to, e.g., plagiarism.
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Section 5

The Dissertation

General guidelines

The Research Office will provide all students with detailed guidelines on the conventional requirements for the dissertation, including a structure and the motivation for the dissertation.

All students will attend four research orientation modules initiated by the Key Account Manager of the cohort in which they will be steered concerning research and drafting proposals.

The Da Vinci Doctor of Philosophy (PhD) Roadmap

All students will attend four research orientation modules initiated by the Key Account Manager of the cohort in which they will be steered concerning research and drafting proposals.

Module 1: Identification of the underlying Da Vinci philosophy and principles related to research and TIPS
Module 2: Transforming ideas into the research case
Module 3: Launching of the identified research process
Module 4: Finalisation of the research case

Normally students have preferably 12 months to complete the dissertation, including research, analysis of results and drafting. (Note: Too often the time required to write the dissertation is underestimated and students start too late.)

NB: Both supervisors should explicitly, and in writing, give their approval for the student to submit the dissertation for examination and fill out a form in which it is agreed that the dissertation complies with the requirements of an academic research report.

The dissertation: requirements and structure

A dissertation is a formal academic research report on a good practical research project – flawed literature research and research process cannot be disguised in an elegant report. However, good research can sometimes be obscured by poor structuring, language and technical editing and a general careless approach. It should communicate effectively with the relevant research, innovation, professional and employer communities. The structure would comply with standard conventions and it should be concise, i.e. normally not exceeding 80 – 120 pages. It is important that the dissertation should be professionally edited – language and technical aspects – and comply with The Da Vinci guidelines (see Dissertation_ Thesis Guidelines) and Research proposal framework.

- Cover, title page and other front matter should comply with Da Vinci specifications.
- Abstract/Summary: This gives the reader a brief summary of the academic research report: on research objectives, research methodology, results, and conclusions/recommendations – not more than 350 words, or one page. No sources are cited.
- Table of Contents: Properly structured, clearly shows section sequence and logical flow of dissertation. Its importance often underestimated, the Table of Contents clearly indicates the structure of the dissertation.
- Chapters 1 – Introduction: Rationale for the study; general statement of the problem; aim of the study; key research question/objectives stated explicitly; introduction to research methodology; structure of the rest of the dissertation.
- Chapter 2 – Conceptual framework and literature review: Definition of key concepts (variables, factors, and drivers) and their relationship to each other (= theoretical framework); critical review of the relevant and recent literature. The management of technology, innovation and people in a systemic context integrated into the discussion.

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- Chapter 3 - Research design: Operationalisation of concepts and research questions (also motivation for above); design (e.g. survey, case study, etc.); sources of data/information (e.g. people, documents); measures/instruments for data collection (e.g. questionnaire, interview, focus group, content analysis); statistical and other methods used for analysis of the data/information.
 - Chapter 4 – Results: Presentation of results in explicit, transparent and systematic form and aligned to the description and hypotheses in the previous chapter; results should preferably not be interpreted and comprehensively discussed here – leave the reader to assess the results on his/her own.
 - Chapter 5 – Summary: Evaluation and discussion of the results within the context or rationale of the study, the conceptual framework, design and methods used; an assessment of the extent to which the objectives of the study have been attained, research questions been answered or hypotheses been proved. New perspectives can emerge in this chapter but not new information that should have been covered in earlier chapters. No new material should be added in Summary discussion chapter – which means: no sources should be cited.
 - Chapter 6 – Implementation: Guidelines or a framework on how the findings (could be in the form of hard/soft technology and innovation) should be implemented for maximum impact.
 - References - Use the Harvard referencing style. (If a literature source provides any information, it should be cited in the text and listed in the list of references.)
 - Appendices: All relevant material that would not assist the reader to follow the text of the dissertation should be included in the appendix/ces. These normally include questionnaires and measuring instruments, short transcriptions (especially in the case of qualitative research approaches), preliminary illustrative material and data sets.

Submission of the dissertation

The dissertation should be submitted according to the dates and guidelines provided by the Research Office, prior to the end of the student's registration.

Four soft bound copies to be submitted: One directly to the field supervisor, the other three to Da Vinci where it will be date stamped, and one will be sent to the academic supervisor, the external examiner and the third, moderated by the Research Office.

Where a student cannot submit for relevant medical reasons, a doctor's certificate must be supplied. (Note: Unacceptable reasons for late submission include: ignorance, public and other holidays, loss of data files, and unavailability of computer facilities including printers, minor illnesses such as flu, poor programme management, and unavailability of supervisors.)

Examination

The specific guidelines and differential weights of the individual components are available from the Research Office, but the following summary offers an overview of the elements of the examination process.

The following weights are given to different components of the dissertation:

- Quality of the academic content: 60%
- Relevance and application to the work environment: 30%
- Accounting for technology, innovation, people and systems (course work): 10%

After the examination reports on the dissertation have been received from the supervisors and external examiner, The Institute will organise an oral defence of the dissertation, to be attended simultaneously by both supervisors, as well as an audience of approximately five persons who are familiar with the topic, and/or its relevance. (Guidelines for oral defence of a dissertation will be made available by the Research Office.)

The oral defence takes the form of a professional presentation by the student, followed by a question and answer session. The total length of the oral defence will be - 2 hours.

The oral defence is based on the research work carried out by the student.

The oral defence counts 20% towards the final result.

The marks for the oral presentation and the dissertation are allocated by the academic and field supervisors in collaboration with the Research Office, at the conclusion of the presentation, in private. The decisions of the supervisors remain confidential until released by the Academic Board.

The Key Account Managers will submit the mark sheets to the Registrar.

Should the student not pass, he/she will be given one opportunity to improve the dissertation in order to meet the minimum standards. All students are given three months from notification to complete the adjustments.

Appendix 1 offers a summary of category descriptors for evaluating a dissertation.

Section 6

The Thesis

General guidelines

The Research Office will provide all PhD students with detailed guidelines on the conventional requirements for the dissertation, including a framework for the Research proposal and writing of an academic research report.

Four research modules are offered

Module 1: Identification of the underlying Da Vinci philosophy and principles related to research and TIPS
Module 2: Transforming ideas into the research case
Module 3: Launching of the identified research process
Module 4: Finalisation of the research case

Students have preferably 2 years to conclude the thesis, including research, analysis of results and drafting. (Note: Too often the time required to write the dissertation is underestimated and students start too late.)

NB: Both supervisors should explicitly, and in writing, give their approval for the student to submit the thesis for examination and fill out a form in which it is agreed that the thesis complies with the requirements of an academic research report.

The Thesis: Requirements and Structure

A thesis is a formal academic research report on a well-planned and evaluated research project – flawed research cannot be disguised in an elegant report. However, good research can sometimes be obscured by poor structuring, language and technical editing and a general careless approach.

It should communicate effectively with the relevant research, innovation, professional and employer communities. The structure would comply with standard conventions and it should be concise, i.e. normally not exceeding 200 pages. It is important that the thesis must be professionally edited – language and technical aspects – and comply with Da Vinci guidelines (see *Dissertation_Thesis Guidelines*).

- Cover, title page and other front matter should comply with Da Vinci specifications.
- Abstract/Summary: This gives the reader a brief summary of the academic research report: on research objectives, research methodology, results, and conclusions/recommendations – not more than 350 words, or one page. No sources are cited.
- Table of Contents: Properly structured, clearly shows section sequence and logical flow of dissertation. Its importance often underestimated, the Table of Contents clearly indicates the structure of the dissertation.
- Chapter 1 – Introduction: Rationale for the study; general statement of the problem; aim of the study; key research question/objectives stated explicitly; introduction to research methodology; structure of the rest of the dissertation.
- Chapter 2 – Conceptual framework and literature review: Definition of key concepts (variables, factors, and drivers) and their relationship to each other (= theoretical framework); critical review of the relevant and recent literature. The management of technology, innovation and people in a systemic context should explicitly be integrated into the discussion.
- Chapter 3 - Research design: Operationalisation of concepts and research questions (also motivation for above); design (e.g. survey, case study, etc.); sources of data/information (e.g. people, documents); measures/instruments for data collection (e.g. questionnaire, interview, focus group, content analysis); statistical and other methods used for analysis of the data/information.
- Chapter 4 – Results: Presentation of results in explicit, transparent and systematic form and aligned to the description and hypotheses in the previous chapter; results should preferably not be interpreted and comprehensively discussed here – leave the reader to assess the results on his/her own.
- Chapter 5 – Summary: Evaluation and discussion of the results within the context or rationale of the study, the conceptual framework, design and methods used; an assessment of the extent to which the objectives of the study have been attained, research questions been answered or hypotheses been proved. New perspectives can emerge in this chapter but not new information that should have been covered in earlier chapters. No new material should be added in Summary discussion chapter – which means: no sources should be cited.

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- Chapter 6 – Implementation: Guidelines or a framework on how the findings (could be in the form of hard/soft technology and innovation) should be implemented for maximum impact. A PhD thesis should clearly show the contribution of new knowledge to the world of knowledge and application in the world of work.
 - References - Use the Harvard referencing style. (If a literature source provides any information, it should be cited in the text and listed in the list of references.)
 - Appendices: All relevant material that would not assist the reader to follow the text of the dissertation should be included in the appendix/ces. These normally include questionnaires and measuring instruments, short transcriptions (especially in the case of qualitative research approaches), preliminary illustrative material and data sets.

Submission of the thesis

The thesis should be submitted according to the dates and guidelines provided by the Research Office, prior to the end of the student's registration.

Five soft bound copies to be submitted: One directly to the field supervisor (for assessment of requirements for a PhD thesis only), the other four to Da Vinci where it will be date stamped, and one will be sent to the academic supervisor (for assessment of requirements for a PhD thesis only), two to the external examiners and the fourth will be moderated by the Research Office.

Where a student cannot submit for relevant medical reasons, a doctor's certificate must be supplied. (Note: Unacceptable reasons for late submission include: ignorance, public and other holidays, loss of data files, and unavailability of computer facilities including printers, minor illnesses such as flu, poor programme management, and unavailability of supervisors.)

Examination

The specific guidelines and differential weights of the individual components are available from the Research Office, but the following summary offers an overview of the elements of the examination process.

The following weights are given to different components of the dissertation:

- Quality of the academic content: 60%

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- Relevance and application to the work environment, including the Return on Investment (ROI): 30%
 - Accounting for technology, innovation and people in a systemic context of the research topic: 10%.

After the examination reports on the dissertation have been received from the external examiners, the Research Office will organise an oral defence of the thesis, to be attended simultaneously by both supervisors, as well as an audience of approximately five persons who are familiar with the topic, and/or its relevance. (Guidelines for oral defence of a dissertation will be made available by the Research Office.)

The oral defence takes the form of a professional presentation by the student, followed by a question and answer session. The total length of the oral defence will be: 2 hours.

The oral defence is based on the research work carried out by the student.

The oral defence counts 20% towards the final result.

The assessment of the oral presentation will be done by the academic and field supervisors, at the conclusion of the presentation, in private. The decisions of the supervisors remain confidential until released by the Academic Board.

The Key Account Managers will submit the statement of results sheets to the Registrar.

Should the student not pass, he/she will be given one opportunity to improve the thesis to meet the minimum standards. All students are given three months from notification to complete the adjustments.

Appendix 2 offers a summary of category descriptors for evaluating a thesis.

Section 7

Concluding comments

Supervisors are important role players in all forms of postgraduate research, irrespective of the nature of the institution. The importance of the role of supervisors can clearly be seen in the prominence of published analyses of the supervision function, recent textbooks on supervision, workshops on the topic and the fact that many institutions

require supervisors to be accredited. The Da Vinci Institute for Technology and Innovation Management also attaches a great deal of value to the contribution made by its pool of supervisors to the development of its students and their contribution to extending the borders of innovation through research. This concise document attempted to offer Da Vinci supervisors an overview of general and conventional guidelines, as well as requirements unique to Da Vinci. The nature of the supervision role is, however, a dynamic process that often generates unexpected outcomes and it would consequently be naive to pretend to cover the field in an exhaustive way in a document such as this. A guideline document will always be 'work-in-progress'. Supervisors are consequently invited to provide the Research Division with relevant perspectives, experiences and suggestions that could be accounted for in a revision of this document.

Section 8

Source material

The guidelines presented in this publication are based on a combination of extensive experience in postgraduate training and supervision, self-initiated and commissioned research, draft Da Vinci guidelines, exposure to colleagues and, of course, consulting relevant publications. The last decade has produced a range of publications dealing with various facets of postgraduate training and supervision of which the following three South African publications are useful and largely aligned to the general approach followed in the present Da Vinci document – in fact, the book by Mouton is prescribed for the Da Vinci modules in research methodology:

- Hofstee, E. (2006). *Constructing a good dissertation. A practical guide to finishing a masters, MBA or PhD on schedule*. Sandton: EPE.
- Lategan, L.O.K. (ed.) (2008). *An introduction to postgraduate supervision*. Stellenbosch: Sun Press.
- Lee, N.J. (2009). *Achieving your professional doctorate: A handbook*. New York: SRHE Open University Press.
- Lessem, R. and Schieffer, A. (2010). *Integral Research and Innovation: Transforming Enterprise and Society*. London: Gower publishing.
- Mouton, J. (2001). *How to succeed in your master's and doctoral studies: A South African guide and resource book*. Pretoria: Van Schaik.
- Scott, D., Brown, A., Lunt, I. and Thorne, L. (2004). *Professional Doctorates: Integrating Professional and Academic Knowledge*. New York: SRHE Open University Press.

Appendix 1: Descriptors for Allocating Marks for a Dissertation

[Please note that the descriptors in each case represent the lower end of the particular rating scale]

Mark Level	Comprehension & Analysis	Coverage	Presentation
75+ Distinction	<ul style="list-style-type: none"> Near to total mastery of all aspects of the subject matter (conceptual understanding, research technical competence, evaluation, interpretation and application) Pervasive creativity and originality of thought Substantiated critical approach to all aspects of the study Multiple examples of independent thought Validity of main findings are beyond any doubt and far-reaching Ability to apply/implement findings Publishable quality with no more than minor revisions 	<ul style="list-style-type: none"> All objectives are fully covered Exhaustive coverage of relevant material; beyond the scope of master's In short: 'going beyond' 	<ul style="list-style-type: none"> Exceptional written communication skills with faultless composition, grammar and spelling. Excellent structured, effective lay-out and design to comply with topic and content Faultless technical and language editing Professionally produced document In short: excellent and convincing communication
60-74 Very good pass	<ul style="list-style-type: none"> Sound and thorough grasp of the subject matter though lacking in the breadth and depth (there are a few gaps leading to some shortfalls) Limited examples of substantiated critical approach and some attempt at original thought Validity of main findings are acceptable but limited in reach Sensitivity to practical implications of the findings of the study With additional inputs the work may be publishable 	<ul style="list-style-type: none"> Most major objectives are covered Comprehensive coverage of primary sources and relevant material In short: 'worth investing in for the future'; expected to proceed to PhD 	<p>Effective presentation,</p> <ul style="list-style-type: none"> Generally good written communication skills with good spelling and grammar Structure, lay-out and design good but not exceptional; room for improvement here and there Technical and language editing done but minor errors slipped through

Mark Level	Comprehension & Analysis	Coverage	Presentation
50-59 Pass	<ul style="list-style-type: none"> • Sufficient understanding of the subject matter with some uncertainty/confusion, gaps and peripheral errors • Direct reflection of what is already known without much creativity and originality • Moderate to weak demonstration of critical abilities and independent thought • Findings are essentially sound, but limited; interpretations do not optimally exploit them; unsubstantiated interpretations may occur • Recommendations relate to the findings, without exploiting their full reach; sensitivity to the need for implementation 	<ul style="list-style-type: none"> • The basic requirements of the work are covered • Limited coverage of required sources and relevant material • In short: 'just the required' for postgraduate research 	<ul style="list-style-type: none"> • Effective written communication skills lacking imagination, though • Satisfactory overall structure, reasonable layout and design • Adequate technical and language editing, but too many lapses
40-49 Refer back for essential amendment	<ul style="list-style-type: none"> • Showing familiarity with the subject matter, but with major gaps and serious misconceptions • A low level of technical competence with many errors. An incomplete and/or partially correct answer • There is some evidence that concepts and theory are understood and there is a modest attempt to analyse them • There is a tendency towards uncritical description/replication and very little to no evidence of original ideas • There is little discussion on the application of knowledge, few, if any, conclusions drawn and recommendations for improvement are either missing or unsubstantiated 	<ul style="list-style-type: none"> • Some of the basic requirements of the work have not been covered • Limited coverage of relevant material with over-reliance on secondary sources • Few, if any, examples used. Few references cited. Little evidence that any reading around the subject has been carried out 	<ul style="list-style-type: none"> • Less than optimal presentation, lacking in logical structure, making it difficult to read. Ideas are poorly expressed, often with mistakes. There are errors in grammar and/or spelling • Diagrams, contents sheet, page numbering, references and bibliography may be poorly presented or some missing

<p><40 Fail</p>	<ul style="list-style-type: none"> • Showing serious gaps in knowledge of the subject matter and many areas of confusion • Technical competence is poor with many serious errors and there is an inability to apply knowledge • Does not demonstrate understanding of the issue and information/data used may be irrelevant • Overall not a document that the company/ university would wish to have its name on • Little or no evidence that concepts and theory have been understood and little or no attempt at sustained analysis • There is a lack of critical appreciation and often the question has been ignored or badly misunderstood • Does not demonstrate the ability to appropriately apply tools/techniques/ methodologies 	<ul style="list-style-type: none"> • Few or none of the basic requirements of the work have been achieved • Inadequate/superficial coverage of relevant material and little use of even course material • Little or no indication of the student's own efforts and contribution. Hardly any references used 	<ul style="list-style-type: none"> • Poor or muddled presentation and structuring of arguments. The level of expression is inadequate, often being unclear or confused. Poor grammar and/or spelling • Diagrams, contents sheet, page numbering, references and bibliography poorly presented or missing
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Appendix 2: Descriptors for Allocating Marks for a Thesis

[Please note that the descriptors in each case represent the lower end of the particular rating scale]

Mark Level	Comprehension & Analysis	Coverage	Presentation
75+ Degree awarded	<ul style="list-style-type: none"> Near to total mastery of all aspects of the subject matter (conceptual understanding, research technical competence, evaluation, interpretation and application) Pervasive creativity and originality of thought Substantiated critical approach to all aspects of the study Multiple examples of independent thought Validity of main findings are beyond any doubt and far-reaching Ability to apply/implement findings Publishable quality with no more than minor revisions 	<ul style="list-style-type: none"> All objectives are fully covered Exhaustive coverage of relevant material; beyond the scope of master's In short: 'going beyond' 	<ul style="list-style-type: none"> Exceptional written communication skills with faultless composition, grammar and spelling. Excellent structured, effective lay-out and design to comply with topic and content Faultless technical and language editing Professionally produced document In short: excellent and convincing communication
60-74 Degree awarded	<ul style="list-style-type: none"> Sound and thorough grasp of the subject matter though lacking in the breadth and depth (there are a few gaps leading to some shortfalls) Limited examples of substantiated critical approach and some attempt at original thought Validity of main findings are acceptable but limited in reach Sensitivity to practical implications of the findings of the study With additional inputs the work may be publishable 	<ul style="list-style-type: none"> Most major objectives are covered Comprehensive coverage of primary sources and relevant material In short: 'worth investing in for the future'; expected to proceed to Ph D 	<p>Effective presentation,</p> <ul style="list-style-type: none"> Generally good written communication skills with good spelling and grammar Structure, lay-out and design good but not exceptional; room for improvement here and there Technical and language editing done but minor errors slipped through

Mark Level	Comprehension & Analysis	Coverage	Presentation
50-59 Degree awarded	<ul style="list-style-type: none"> • Sufficient understanding of the subject matter with some uncertainty/confusion, gaps and peripheral errors • Direct reflection of what is already known without much creativity and originality • Moderate to weak demonstration of critical abilities and independent thought • Findings are essentially sound, but limited; interpretations do not optimally exploit them; unsubstantiated interpretations may occur • Recommendations relate to the findings, without exploiting their full reach; sensitivity to the need for implementation 	<ul style="list-style-type: none"> • The basic requirements of the work are covered • Limited coverage of required sources and relevant material • In short: 'just the required' for postgraduate research 	<ul style="list-style-type: none"> • Effective written communication skills lacking imagination, though • Satisfactory overall structure, reasonable layout and design • Adequate technical and language editing, but too many lapses
40-49 Refer back for essential amendment	<ul style="list-style-type: none"> • Showing familiarity with the subject matter, but with major gaps and serious misconceptions • A low level of technical competence with many errors. An incomplete and/or partially correct answer • There is some evidence that concepts and theory are understood and there is a modest attempt to analyse them • There is a tendency towards uncritical description/replication and very little to no evidence of original ideas • There is little discussion on the application of knowledge, few, if any, conclusions drawn and recommendations for improvement are either missing or unsubstantiated 	<ul style="list-style-type: none"> • Some of the basic requirements of the work have not been covered • Limited coverage of relevant material with over-reliance on secondary sources • Few, if any, examples used. Few references cited. Little evidence that any reading around the subject has been carried out 	<ul style="list-style-type: none"> • Less than optimal presentation, lacking in logical structure, making it difficult to read. Ideas are poorly expressed, often with mistakes. There are errors in grammar and/or spelling • Diagrams, contents sheet, page numbering, references and bibliography may be poorly presented or some missing

<p><40 Fail</p>	<ul style="list-style-type: none"> • Showing serious gaps in knowledge of the subject matter and many areas of confusion • Technical competence is poor with many serious errors and there is an inability to apply knowledge • Does not demonstrate understanding of the issue and information/data used may be irrelevant • Overall not a document that the company/ university would wish to have its name on • Little or no evidence that concepts and theory have been understood and little or no attempt at sustained analysis • There is a lack of critical appreciation and often the question has been ignored or badly misunderstood • Does not demonstrate the ability to appropriately apply tools/techniques/ methodologies 	<ul style="list-style-type: none"> • Few or none of the basic requirements of the work have been achieved • Inadequate/superficial coverage of relevant material and little use of even course material • Little or no indication of the student's own efforts and contribution. Hardly any references used 	<ul style="list-style-type: none"> • Poor or muddled presentation and structuring of arguments. The level of expression is inadequate, often being unclear or confused. Poor grammar and/or spelling • Diagrams, contents sheet, page numbering, references and bibliography poorly presented or missing
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