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Master Dissertation

GUIDE

Master of Advanced Technologies and Innovation for Wood-based Industry | Compulsory | ECTS 5

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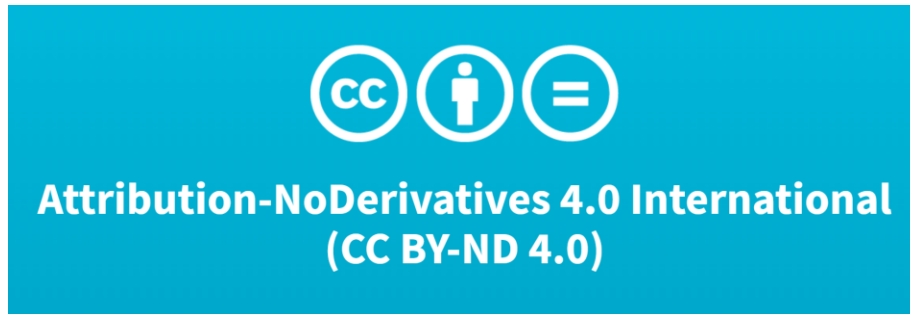
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Framework

This guide has been developed within the framework of the project:

Table of Contents

Course description

During this course, Master Dissertation, students have to show a practical implementation of the knowledge on Industry4.0 acquired in the Master´s courses. There are four possible areas in which to focus and do this work:

- Processes and production of furniture

- Intelligent and sustainable design

- Wood and new materials

- Innovation management

Tasks that are expected to carried out by students are:

• Presentation of work topics and research planning

• Compilation and analysis of information related to the Master's Dissertation

• Development of the Final Master's Dissertation

• Oral Master Dissertation Examination

The Master Dissertation will be evaluated by a specific Committee in accordance with the procedures and requirements established by the University, in the periods fixed annually in the academic calendar.

Degree:	**Master of Advanced Technologies and Innovation for Wood-based Industry**
Course	**Master Dissertation**
Type:	Compulsory
ECTS:	5

Course Learning outcomes

1. Assess the techniques presented in the different subjects of the Master related to Industry4.0 in the wood and furniture sector to a specific problem.

2. Demonstrate from results, improvements in the activity of a process of the wood industry by applying the concepts seen in the Master.

3. Explain its results and conclusions in a clear and effective way.

4. Defend the knowledge and competences acquired throughout the Master.

INTRODUCTION

The culmination of the Master Degree of Advanced Technologies and Innovation for Wood-based Industry is seen in the completion of a research work in the form of a Master Dissertation. The Master Dissertation is a key evidence of the student's knowledge and competence in their area of specialization at the end of the Master Degree, being the mark of the student's achievement as a postgraduate student.

All Master Dissertations should follow up certain academic conventions and rules. This guide is intended to assist the graduate students on this Master in the preparation of their Master Dissertation in terms of formatting and writing conventions, while offer some examples of potential ideas of research topics. Students should refer closely to this guide, but also check rules established in the University and School where they are enrolled, asking for advice to their supervisors.

Thus, this guide contains both general and specific guidelines to be carried out the necessary work for the final submission of the dissertation, including clear instructions on matters relating to its format.

1. PROCESS OF THE MASTER DISSERTATION

This is a general guide with info about the generic process a student should follow-up to start, develop and submit a Master Dissertation. Students should also consult the official guides on Master Dissertations on their Universities and Schools in any case.

1.1 Process to start a Master Dissertation

Once the student is enrolled in the Master Degree, during the first semester should start with the first steps. Hereinafter are described the basic steps to star with the Master Dissertation, mainly common in all universities:

1. Finds a possible supervisor. In some cases, the department could assign the student to available and related supervisor.

2. Define a topic of interest and a research planning, with the approval of the supervisor.

3. Submit the dissertation proposal to the Master coordinator.

4. After acceptance, develop the research work, normally during the second semester.

1.2 Process to submit a Master Dissertation

Once the student has completed the Master Dissertation, normally before end of second semester, student and supervisor should initiate the process to officially approve and register the Master Dissertation in the School/University catalogue. These are common steps in most of the Universities that should be followed:

1. Submission of Master Dissertation to supervisor for evaluation.

2. Student make corrections (if any) and submit final version to the supervisor.

3. Appointment of internal and external examiners by the supervisor.

4. Dissertation is submitted to examiners[1].

5. Oral examination.

6. Once approved by the Oral Examination Committee, student must submit Master Dissertation in bound and/or digital form to the supervisor and Master Coordinator.

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[1] It is a compulsory requisite to pass all Master Degree courses before to submit and defend the Master Dissertation.

2. SPECIFICATIONS OF THE MASTER DISSERTATION

Master Dissertations should conform to several technical specifications, related with format and content structure. This is a general guide with basic instructions on how to develop correctly a Master Dissertation, with rules mainly adopted by all Universities, but students should also check internal guides or rules of their Schools and Universities.

2.1 Technical specifications

2.1.1 Language

Master Dissertation should be written in English, with an abstract in Bahasa Melayu and English.

2.1.2 Title

The title of the Master Dissertation should be clear and concise. It should express in a short sentence the main objective of the research.

2.1.3 Extension

Most of the Universities defined that a Master Dissertation should not exceed 250 pages and should have between 7.000 – 15.000 worlds.

2.1.4 Layout

Typeface and font size

The text of the Dissertation, including headings and page numbers, must be produced with the same font or typeface. It is recommended to use Times New Roman 12 point, as typeface. Text should not be scripted or italicised except for scientific names and terms in a different language. Bold print may be used for headings, that should be correctly numbered. Footnotes, quotations, and text in tables should not be less than 10-point.

Margins

A margin is the amount of blank space from the edge of the page to any print, be it a heading, page number, figure, or text. The left margin should be at least 40 mm, and the right, top and bottom margins at least 25 mm.

Spacing

The thesis should be double-spaced, with four spaces between paragraphs and sections. The following, however, should be single-spaced:

The main body text should be justified. It is recommended that Dissertation uses 1.5-line spacing, and not leave a line between paragraphs. Leave a 1.5 line spacing before a heading.

Pagination

All pages should be numbered consecutively throughout the thesis, except the cover. Page numbers should be placed at the bottom of the page.

References

It is recommended that citation and referencing for a Master Dissertation follow either the American Psychological Association (APA), Institute of Electrical and Electronics Engineers (IEEE), Harvard, Chicago or House style. The chosen citation and referencing styles should be used consistently throughout the text and references section.

2.2 Sections

This section describes what is generally known as a conventional format of a Dissertation. There are different allowed formats, but roughly it consists of three main parts: preliminary page, main body, and supporting pages. Dissertations are usually divided into chapters and sections, and should be bound in a single volume, except if supporting pages are extremely long.

Hereinafter are briefly described each of the three main parts of a Dissertation. Nevertheless, students should check the different guides and rules of their School and/or Universities to ensure the accomplishment of possible internal rules.

2.2.1 Preliminary page

The preliminary pages usually include the following aspects in this order:

- Title page
- Acknowledgements
- Abstract, in English and Bahasa Melayu, and keywords
- Contents
- List of tables
- List of figures
- List of abbreviations

2.2.2 Main body

Usually divided into chapters and sections. There are different ways to format the chapters, but generally this is the logical sequence:

1. Introduction

It introduces the background and problems being studied, and indicates its importance and validity. It sets the scope and objectives of the study.

2. Literature review

This section outlines a critical and comprehensive review of the existing literature related to the topic of thesis. Literature selected must be up to date, and be analysed and synthesised logically.

3. Methodology

It contains a detailed description and justification of the researched done. Materials and experimental methods and designs should be described sufficiently detailed to facilitate their replication by another researcher.

4. Results

This section presents a complete account of the results obtained within the study. These can be presented in the form of figures, tables, etc. with an analytic text. This section may also be combined with the Discussion because the content should be related.

5. Discussion

This section contains the detailed analyses of the results presented in the previous section. Results should be discussed in relation with the objectives set out in the introduction, while bridging the data of results section with the conclusions drawn.

6. Conclusion and future research

This is a key section that illustrates the significance of the study and stresses the findings upon which conclusions are drawn in line with the objectives set, and suggests further research on the topic. It should start with a summary of the study´s findings and its discussion, followed by a recommendation for future research, and finalize with conclusion or conclusions of the study.

2.2.3 Supporting pages

It should contain references, appendices, personal data of the student and list of publication (if any).

References

The References, also named as Bibliography, contain the list of works cited in the Dissertation. It must follow the already described format of citation a referencing.

Appendices

This section contains information or data too detailed or/and long for the main body. Appendices include original data, summary, preliminary tests, tabulations, tables, very lengthy quotations, documents, detailed engineering drawings and any other necessary documents. Appendix materials could be grouped by type in different appendices.

Biodata of the student

This section, not compulsory in all Universities, contains the student's biographical information, in the form of a complete Curriculum Vitae that includes educational background, professional work experience (if any), and any other similar matters that may interest the reader.

List of publications

All accepted publications carried out as result of the undertaken study, where the student if the main author, and performed under supervision and during their candidature. These publications should not be used as references in the Dissertation.

3. EXAMPLES OF MASTER DISSERTATION

Courses of the Master of Advanced Technologies and Innovation for Wood-based Industry are grouped in four different modules. To select and define the research topic of the proposed Master Dissertation it is suggested to focus on one of the topic's modules. Nevertheless, students should show a professional management of acquired knowledge in any course in their Dissertation.

Four real examples are being proposed, one per module, developed in different Universities as Master Dissertations or Thesis as inspiring ideas on how to focus the research work. Boxes include original extracts of the researches. Students are encouraged to use Open Access Theses and Dissertations database[2] for more examples.

Module 1. Processes and production of furniture
Title
Innovative use of CNC technology for the manufacture of furniture in batch size of one Author: Ashley, Philip Neil. Degree: Ecosystem and Forest Sciences, 2016, University of Melbourne URL: http://hdl.handle.net/11343/118610
Issue
Furniture manufacturing in Australia is traditionally a high-volume production system with a high-mix of products and parts. To remain competitive, it must change to low volume high-mix production. It has been stablished that in an ideal situation, the goal for CNC technology is to make one complete set of furniture components ready to assemble and eliminate batches of components

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[2] https://www.oatd.org

on the shop floor. This manufacturing solution is referred as "Batch Size One" and by inference is a low volume system.

Objective

The aim of the study was to examine the feasibility of cost-effectively manufacturing one complete set of solid wood furniture components as a batch size of one.

Methodology

This analyzed study assesses methods that could be used to reduce batch sizes; in particular the viability of combining all of the components for one piece of furniture into a single CNC program. A number of examples are presented and the advantages and disadvantages to small batch sizes evaluated and discussed. CNC machinery, cutting tools, tool holding devices and emerging technology are assessed for performance and suitability for lean manufacturing and small batch sizes. Practical methods to improve production efficiency by organizing workflow and re-thinking how components are processed are demonstrated.

Result

This work concludes that there is no commercial gain in combining all of the parts of a piece of furniture in the one CNC program. It (rather) finds that utilizing appropriate cutting tools and smart processes will bring about gains in productivity that is currently unrealized.

Module 2. Intelligent and sustainable design

Title

Designing sustainable innovations. Opportunities for new life cycles within the furniture industry

Author: Comacchio, Zeno.
Degree: Design, 2016, Linnaeus University
URL: http://urn.kb.se/resolve?urn=urn:nbn:se:lnu:diva-57669

Issue

The Linear Economy cannot any longer be sustained by the eco-system. For this reason, in the last few years Circular Economy has become an increasingly discussed topic worldwide. Through the adoption of strategies that close-the-loop of the traditional linear production system, Circular Economy aims to find solutions that can create a balance between economy, society and environment.

This dissertation approaches the systemic thinking that characterize Circular Economy and relates it to the furniture industry business in order to investigate present challenges, opportunities and to identify the main actions that can be undertaken in order to begin the transition to a circular system.

Objective

The study aims to firstly investigate and generate a holistic overview about the current situation of the furniture industry in relation to the concept of Circular Economy and to analyse the opportunities and obstacles related to the transition from a linear to a circular business model. Secondly, to investigate and propose concrete strategies and possible improvements in products' life cycle utilizing as case study two specific IKEA products.

Methodology

Firstly, it was carried out an academic and professional literature review in order to gather information about theory and practice related to the implementation of strategies needed by a Circular Economy. Furthermore, the need of an innovative and holistic approach is discussed with particular emphasis on the importance of a systemic thinking that enable organisation to create their own identity and objectives in relation to the Circular Economy model.

To conclude, a comparison between two IKEA products was performed to identify the role of the products' design and development in relation with the implementation of a Circular Economy model.

Result

A life cycle approach combined with appropriated innovative design strategies open a wide range of new opportunities from a sustainable, economic and social perspective. It is important to consider that these changes regard the whole organisation system ant that a new design system is necessary in order to develop appropriate services and products.

The most important operations to make a circular system effectively work are refurbishing, reuse, remanufacturing and recycling. In order to allow these operations two main aspects have to be planned: product disassembly and product recovery.
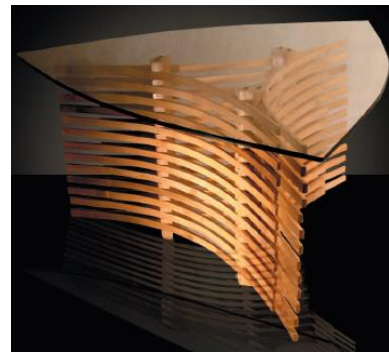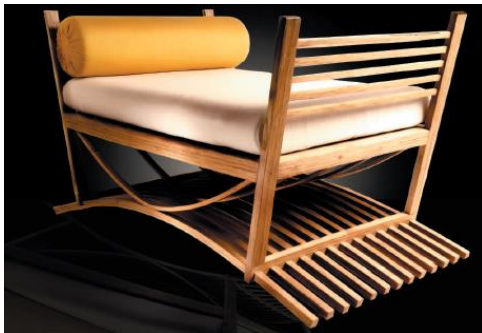
Module 3. Wood and new materials

Title

Exploring the design potential of bamboo for contemporary furniture

Author: Kusumawardhani, E.
Degree: Master of Design, 2010, RMIT University
URL:https://researchrepository.rmit.edu.au/permalink/61RMIT_INST/13r5bm8/alma9921861376401341

Issue

Bamboo's strength and elastic properties make it an important traditional material within all aspects of Indonesian culture and ideal for the design and production of a wide range of household objects and furniture. The durability and longevity of bamboo makes it a material that is suitable for the construction of buildings, furniture and everyday items. Although the use of bamboo as contemporary material in furniture production is beginning to be recognised, it has yet to be recognised as a viable material from which to design and produce contemporary furniture items in Indonesia for the international market.

Objective

This study focused on the development of a new set of sensibilities and approaches toward the manipulation of bamboo in the design and production of contemporary furniture in Indonesia.

Methodology

The research began through the exploration of bamboo as a material used by traditional artisans in the manufacture of crafts and furniture and examined the lack of development of bamboo's potential amongst the traditional crafts and furniture industry in Indonesia.

Secondly, through the process of design development, the function of a traditional daybed was translated into two types of contemporary furniture, a double seated couch and a coffee table. The third piece to be designed was a screen/room divider: used as a substantial furniture form that would clearly define the different parts or functions of an interior space.

Result

It was concluded that an opportunity existed to consider the manipulation of bamboo in different ways through an engagement with the various technologies that have been developed in western industrial practices. It was felt that the adoption of design, construction and fabrication methods common in western furniture design practice could stimulate the development of new ways of thinking about the production of furniture in Indonesia that would integrate aspects of traditional craft and modern manufacturing techniques.

The three pieces of furniture that were designed for the research (coffee table, double seated couch and room divider) are examples of transforming traditional Indonesian furniture forms into contemporary pieces.

Module 4. Innovation management

Title

Management innovation, radical innovation and business performance: the role of knowledge resources for high technology SMEs

Author: Bakry, Faridah Mustaffa
Degree: Design, Manufacture and Engineering Management, 2013, University of Strathclyde
URL: http://oleg.lib.strath.ac.uk/R/?func=dbin-jump-full&object_id=23188

Issue

Over the past 30 years, innovation has been identified as the most important contributor to both the competitive advantages of SMEs and the industry's general economic growth. The ability to innovate and generate new ideas enables SMEs to gain strength in the dynamic competitive environment. Therefore, innovation plays a significant role in their attempts to become more competitive and successful.

The extant literature shows that the development of high-technology-based firms has been actively encouraged as a source of competitive advantage and job opportunities. However, studies of knowledge development at small high-technology SMEs are very limited and have not received enough attention to date.

Objective

The overall aim of this research is to understand the possible impact of knowledge resources on innovation (management innovation and radical innovation) and the business performance of high-technology SMEs in the context of developed and developing countries. This research aims to

comprehensively study existing research into the innovation area by providing reviews of the evidence derived from many disciplines and research fields.

By studying this, the thesis also aims to investigate the applicability of existing innovation frameworks for the analysis of the relationship between management innovation and radical innovation and these relationship impact on the success of SMEs across context of an economy

Methodology

Building upon theoretical work on the knowledge-based view and innovation management literature, it is developed a conceptual model to answer three important questions about the relationship between management innovation radical innovation, resources development, business performance, and economic environment.

The model is tested with data collected from a designed web-based survey. The targeted respondents were operations directors/managers from high-technology SMEs in the United Kingdom and Malaysia. A total of 256 effective questionnaires were analysed based on statistical analysis methods such as factor analysis and structural equation modeling.

Result

The empirical result for the UK dataset shows that humanware and techware contributed to the development of management innovation. The result specified that management innovation is an antecedent to radical innovation. Nevertheless, the innovation model in the developed countries is not applicable to developing countries. The possible explanations for these findings are that each of the countries has different settings for knowledge resources, innovation abilities and the business environment.