T.C.

YILDIZ TECHNICAL UNIVERSITY
FACULTY OF MECHANICAL ENGINEERING
DEPARTMENT OF INDUSTRIAL ENGINEERING

UNDERGRADUATE GRADUATION THESIS WRITING GUIDE

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| First Student Name Surname |
| Second Student Name Surname |
| Third Student Name Surname |

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| Advisor |
| Prof. Dr. Nihan ÇETİN DEMİREL |

UNDERGRADUATE GRADUATION THESIS

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# **LIST OF SYMBOL**

|  |  |
| --- | --- |
|  | : Cost between points and |
|  | : Unit transportation cost of the product supplied from warehouse to retailer  |
|  | : Demand of customer  |
|  | : Demand of retailer  |
|  | : Index and set definitions for retailers |
|  | : Index and set definitions for factories |
|  | : Index and set definitions for customers |
|  | : Capacity of factory  |
|  | : Distance between points and  |
|  | : Capacity of warehouse  |
|  | : Index and set definitions for warehouses |
|  | : Quantity to be transported from warehouse to retailer  |

# **LIST OF ABBREVIATION**

|  |  |
| --- | --- |
| APA | : American Psychological Association |
| IEEE | : Institute of Electrical and Electronics Engineers |
| min | : Minutes |
| TQM | : Total Quality Management |
|  |  |
|  |  |

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# **ABSTRACT**

**Guidelines for Writing the Undergraduate Graduation Thesis**

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| First Student Name Surname |
| Second Student Name Surname |
| Third Student Name Surname |

**Industrial Engineering Department Graduation Thesis**

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| --- |
| Advisor |
| Prof. Dr. Nihan ÇETİN DEMİREL |

This thesis encompasses the process in which the student identifies, analyzes, and develops a solution to a specific problem using the knowledge and skills acquired during their undergraduate education. The abstract should clearly state the aim of the study, briefly explain the methods or approaches used, and present the key findings. Additionally, the application area of the study, the problems it addresses, and the significance of its results should be emphasized. Without delving into technical details, the abstract should provide the reader with a general understanding of the scope and outcomes of the study. The abstract should typically be between 150 and 250 words and written in third-person singular.

The abstract should concisely and clearly express the scope, purpose, methods used, and main findings of the study. The text must be justified on both sides, written in Times New Roman font with 1.5 line spacing, and consist of 150 to 250 words. The use of bold text should be avoided; if emphasis is needed, *italic* formatting should be used. At the end of the abstract, at least three and at most six keywords that represent the study should be included. Each keyword must begin with a capital letter, be separated by commas, and a period should be placed at the end of the final keyword.

**Keywords**: Industrial Engineering, Graduation Thesis, Thesis Presentation, Teamwork.

# **ÖZET**

**Lisans Bitirme Çalışması Yazım Kılavuzu**

|  |
| --- |
| Birinci Öğrenci Adı Soyadı |
| İkinci Öğrenci Adı Soyadı |
| Üçüncü Öğrenci Adı Soyadı |

**Endüstri Mühendisliği Bölümü Bitirme Çalışması**

|  |
| --- |
| Danışman Öğretim Üyesi |
| Prof. Dr. Nihan ÇETİN DEMİREL |

Bitirme çalışmasına ait tezin özet kısmında, bu çalışma kapsamında yapmış olunan ve öğrencinin lisans eğitimi süresince edindiği bilgi ve becerileri kullanarak belirli bir problemi tanımlaması, analiz etmesi ve çözüm üretmesi sürecini kapsamaktadır. Özet bölümünde çalışmanın amacı açıkça belirtilmeli, kullanılan yöntem veya yaklaşımlar kısaca açıklanmalı ve elde edilen temel bulgulara yer verilmelidir. Ayrıca çalışmanın uygulama alanı, katkı sağladığı problemler ve sonuçların önemi vurgulanmalıdır. Teknik detaylara girilmeden, okuyucunun çalışmanın kapsamı ve çıktıları hakkında genel bir fikir edinebilmesi hedeflenmelidir. Özet, genellikle 150–250 kelime arasında tutulmalı ve üçüncü tekil şahıs kullanılarak yazılmalıdır.

Özet metni, çalışmanın kapsamını, amacını, kullanılan yöntemleri ve elde edilen temel sonuçları kısa ve açık bir şekilde ifade etmelidir. Metin, her iki yana yaslı olacak şekilde hizalanmalı, Times New Roman yazı stili ve 1,5 satır aralığı kullanılmalıdır. Toplam kelime sayısı 150 ile 250 arasında olmalıdır. Özet içerisinde kalın (bold) yazım kullanılmamalı; kavramların veya ifadelerin vurgulanması gerektiğinde *italik* biçimi tercih edilmelidir. Metnin sonunda, çalışmayı temsil eden en az üç, en fazla altı anahtar kelime yer almalıdır. Anahtar kelimelerin her biri büyük harfle başlamalı, aralarına virgül konulmalı ve son anahtar kelimenin sonuna nokta koyulmalıdır.

**Anahtar Kelimeler**: Endüstri Mühendisliği, Bitirme Çalışması, Tez Sunumu, Grup Çalışması.

# **INTRODUCTION**

This section of the thesis will be presented under two subheadings. The first subheading explains the essential content that should be included in the introduction chapter of the thesis. The second subheading provides information regarding the formatting requirements that must be considered in this section.

## **Structuring the Introduction Section**

The introduction is the section where the reader is first introduced to the study and understands why the topic is important. This part should both present the overall framework of the study and prepare the reader for the subject. The following elements must be included in the introduction:

1. **General Introduction to the Topic**: The field addressed by the study, its current relevance, areas of application, and why it is important should be briefly explained. This part should position the topic within the larger context ("the big picture").
2. **Problem Definition:** The specific problem that the study aims to solve should be clearly defined. Why is this problem important? Whom or what does it affect? These questions should be answered.
3. **Objective of the Study:** This section should state what the study aims to achieve and what question it seeks to answer. It should clearly respond to the question: “What is this study trying to do?”
4. **Methodological Approach (briefly):** How has the problem been approached? Which method(s) or approaches will be used? This part should provide only a general overview, without going into technical details.
5. **Scope and Limitations of the Study:** The boundaries of the study must be clearly stated—what it includes or excludes. For example, the study may focus on a specific sector or geographical region.
6. **Place in the Literature and Contribution:** If there are similar studies, they should be briefly mentioned, and the unique aspects and contribution of this study to the literature should be highlighted.
7. **Structure of the Report (optional)**: Particularly in longer theses, a short summary of the report’s structure may be included. For example: “Chapter 2 presents the literature review, Chapter 3 explains the methodology, and Chapter 4 includes the application…”

## **Formatting Rules to be Considered**

The thesis text must be written in Times New Roman, with a font size of 12 points, and 1.5 line spacing. The entire text should be justified, meaning it should be aligned evenly along both the left and right margins. A consistent formatting style must be followed for all section headings throughout the thesis. First-level main headings (e.g., INTRODUCTION, APPLICATION, and CONCLUSION) should be written in all capital letters. For second-level subheadings, only the first letter of each word should be capitalized, with the remaining letters in lowercase (e.g., Model Definition, Data Collection Process). These formatting rules must be applied consistently throughout the entire thesis.

To ensure that all headings are *automatically included in the table of contents*, each heading must be assigned the appropriate *heading style* in MS Word. This formatting should be applied in accordance with *the styles defined in Figure 1.* **First-level main headings** must use the *Heading 1*style and be formatted in *20-point font* size. **Second-level subheadings** must use the *Heading 2* style and be formatted in *14-point font* size. While the use of **third-level subheadings** is generally discouraged, if needed, they should be formatted using the *Heading 3* style and written in *12-point font* size. Structuring the headings in this way ensures both a well-organized document and the correct and automatic generation of the table of contents.



**Figure 1.** Adding Headings to the Table of Contents

### **Inserting Figures**

All figures used in the thesis or report must be placed in a way that integrates seamlessly with the text. Figures should be center-aligned on the page and designed so that the reader can easily understand their content. Each figure must be of high quality and sufficient resolution, and it should effectively support the textual content.

Every figure must be accompanied by a caption that clearly explains its content. Figure captions should be placed below the figure and formatted as follows:

“Figure X. Figure Title”

Here, "X" indicates the figure number, and figures should be numbered sequentially throughout the thesis (e.g., Figure 1. System Flow Diagram). The caption should not end with a period, and each word should begin with a capital letter, except for prepositions or conjunctions unless they appear at the beginning (excluding proper nouns).

When referring to a figure within the text, proper referencing should be used. For example:“As shown in Figure 2...”, “The system structure is illustrated in Figure 2.” References to figures should be placed naturally within the flow of the paragraph.



**Figure 2.** Example: System Flow Diagram

Additionally, every figure must be described in the text, not just included for visual purposes. Figures should be used not merely to fill space but to enhance the reader’s understanding of the subject matter.

### **Inserting Tables**

All tables used in the thesis or report must be designed to present information in an organized and readable manner. Tables should be placed in relation to the text, and no table should be inserted without being referenced. They must appear in appropriate locations that do not interrupt the flow of content and must be explained within the text.

Tables should be center-aligned on the page. Each table must have a caption placed above the table, formatted as follows:

“Table X. Table Title”

Here, "X" represents the table number, and all tables must be numbered sequentially throughout the thesis (e.g., Table 1. Processing Times on the Production Line).The table title should be written in sentence case, where only the first word is capitalized (except for proper nouns), and it should not end with a period.

**Table 1.** Processing Times by Production Stages (Minutes)

|  |  |  |  |
| --- | --- | --- | --- |
| **Process Name** | **Average Time (min)** | **Minimum Time (min)** | **Maximum Time (min)** |
| Cutting | 12 | 10 | 15 |
| Assembly | 25 | 20 | 30 |
| Quality Control | 8 | 6 | 10 |
| Packaging | 10 | 8 | 12 |

When referring to a table within the text, a clear and guiding expression should be used. For example: “A comparison of process times is presented in Table 3.”or “Detailed analysis results are provided in Table 2.”

Tables should not be unnecessarily complex; instead, they should be simple and easy to read whenever possible. Row and column headers must be clear, and contents should be aligned and meaningful. If a table is too wide to fit in portrait orientation, landscape layout may be used—however, this option should only be applied if truly necessary.

Every table should contribute to the reader’s understanding of the text. Tables should not be used simply to fill space but must support and enhance the content described in the surrounding text.



**Figure 3.** Adding Captions to Figures and Tables

As shown in Figure 3, captions for figures and tables should be added using the designated field found in the References section of the word processor. This allows figures and tables to be easily referenced in the text and automatically included in the initial lists (e.g., List of Figures, List of Tables).

### **Use of Abbreviations in Text**

In theses and academic writings, **abbreviations** can be used to improve **readability** and avoid unnecessary **repetition**, especially for long terms that appear frequently. However, abbreviations must be used in a way that is **accurate**, **consistent**, and **clear**.

* **The Full Term Must Be Written at First Use**: When an abbreviation is used for the first time, **the full term should be written out first**, followed by the **abbreviation** in parentheses. In subsequent uses, only the abbreviation is sufficient.
	+ Example:
		- In this study, an evaluation based on Total Quality Management (TQM) principles was made. Within the scope of TQM, customer satisfaction is a priority.
* **Only Use Abbreviations When Necessary**: Not every long term needs to be abbreviated. If the term appears only once or very infrequently, it is better to use the full form.
	+ Inappropriate: According to Turkish Statistical Institute (TURKSTAT) data… [and never mentioned again]
	+ Appropriate: According to Turkish Statistical Institute data…
* **Abbreviations Should Be Well-Known or Clearly Explained:** If an abbreviation is not widely recognized, it must be clearly defined. Only commonly known abbreviations (e.g., **EU**, **USA**, **ISO**) may be used without explanation.
* **Maintain Consistency:** Abbreviations should be used consistently throughout the text. Avoid using different abbreviations for the same concept (e.g., using MIS in one section and IS in another). This creates confusion and disrupts consistency.
* **List of Abbreviations (Optional):** If your thesis includes many abbreviations, it is recommended to include a *List of Abbreviations* section. Each abbreviation should be listed with its full definition, and the list should be arranged in alphabetical order.

# **LITERATURE REVIEW**

The literature review is the process of systematically examining previous academic research, articles, theses, and reports related to the topic of the study. The main purpose of this section is to present the existing body of knowledge in the relevant field and to position the current study within that context. In the literature review, the student builds the conceptual framework of the topic, summarizes the methods and findings of similar studies, and highlights any similarities and differences among them. Moreover, the student should emphasize how their work contributes to underexplored or underdeveloped aspects in the literature. A literature review is not merely a summary; it should also include a critical evaluation of the existing research. This assessment forms the scientific foundation of the study and supports its originality.

## **2.1. Importance of the Literature Review and Key Considerations**

The literature review is one of the most critical components of a scientific study. This section demonstrates the knowledge base on which the study is built, identifies who has previously examined the topic and from what perspectives, and shows how the current research contributes to the existing literature. For students, this part is not limited to summarizing. The primary aim is to critically evaluate past work, compare different viewpoints, and strengthen the justification of the study.

When conducting a literature review, the following steps can be followed:

* Identify Relevant Sources:

The first step is to find academic sources that are directly related to the topic. These may include journal articles, theses, conference papers, books, and reliable online publications. Sources should be selected based on their scientific credibility.

* Read and Take Notes:

Carefully read the selected sources and take notes on each study’s objective, methodology, data set, findings, and conclusions. This not only facilitates understanding of the content but also enables effective comparisons.

* Reflect on Similarities and Differences:

Identify similarities across studies, what each one focuses on, and where your study fits within that landscape. This analysis is what makes a literature review valuable and insightful.

* Structured and Coherent Writing:

When writing the review, sources should be interconnected and organized in a chronological, thematic, or methodological order. Avoid listing studies separately (e.g., "X did this, Y did that") and instead adopt a holistic narrative. Example:
“In recent years, heuristic algorithms have become widely used in production planning. While Kaya and Demir (2020) emphasized the time-saving advantage of genetic algorithms, Yılmaz (2019) highlighted the accuracy of AI-assisted approaches.”

* Highlight Gaps and Contributions:

At the end of the review, clearly point out the gaps in previous studies or the ways in which your study differs or adds value. This is a key part of justifying why your research is necessary.

Recommendations:

* Do not merely summarize the literature, provide your own interpretation and analysis.
* Compare studies that address the same topic to highlight similarities and differences.
* Use a formal, academic, and objective tone throughout your writing.
* Always cite your sources accurately using the appropriate citation style (e.g., APA, IEEE, etc.).
* Consider using tables or figures to visually support and clarify your literature review when appropriate.

## **2.2. Summary Table of the Literature and Its Use**

The literature summary table is used to present the key characteristics of the reviewed studies in a comparative and concise format. This type of table allows for a quick overview of a large number of studies and provides the reader with a clear summary of research trends, methodologies used, and key findings in the field. Such tables typically include columns like author, year, research objective, method, data set used, and main findings. These tables are especially helpful in fields with extensive literature, as they offer significant convenience to both the writer and the reader.

**Table 2.** Example of a Literature Summary Table

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Writer(s)** | **Year** | **Objective of the Study** | **Method** | **Key Findings** |
| Kaya & Demir | 2020 |

|  |
| --- |
|  |

|  |
| --- |
| Performance of heuristic algorithms in production planning |

 | Genetic Algorithm | Genetic algorithm provided faster solutions compared to traditional methods.. |
| Yılmaz | 2019 | Analysis of artificial intelligence applications in inventory management | Decision Trees | AI improved demand forecasting accuracy by 15%. |
| Özkan ve ark. | 2022 | Evaluation of supply chain risks | Multi-Criteria Decision Making (MCDM) | Risk prioritization enabled more effective strategic decisions. |

## **2.3. Use of References and In-text Citations in APA Format**

The **APA (American Psychological Association)** style is a widely used citation standard across many disciplines, from social sciences to engineering.
In a graduation thesis, correctly referencing all sources used is essential for maintaining academic integrity. APA style requires both **in-text citations** and a properly formatted **reference list** following specific rules.

### **2.3.1. In-text Citations (APA 7th Edition)**

When citing within the text, use the author's surname and the year of publication. If quoting directly, also include the page number.

* **Paraphrasing (indirect citation): The source is rewritten in your own words.**
* Example:
*AI-supported systems are becoming increasingly common in production planning (Yılmaz, 2019).*
* **Direct quotation**: The source is quoted word for word, enclosed in quotation marks, and includes a page number.
* Example:
*“Decision support systems make production processes more efficient” (Kaya & Demir, 2020, p. 45).*
* **If the author’s name is mentioned in the sentence:**
* Example:
*Yılmaz (2019) argued that artificial intelligence increases the accuracy of demand forecasting.*

### **2.3.2. Reference Section Guidelines**

At the end of the thesis, all sources cited in the text should be listed under the *“References”* heading in alphabetical order. Key rules when formatting references in APA style include:

* Write the surname first, followed by the initial(s) of the first name.
* The year is written in parentheses.
* Titles of articles are not italicized, and only the first word of the title and proper nouns are capitalized.
* The format varies depending on the source type (book, journal article, online resource, thesis, etc.).

**Book:**

* Surname, A. A. (Year). *Title of the book: Subtitle if any*. Publisher.
* Example:
	+ Demir, H. (2018). Tedarik zinciri yönetimi ve uygulamaları. Beta Yayıncılık.

**Essay (Journal):**

1. Surname, A. A., & Surname, B. B. (Year). Title of the article. Journal Name, Volume (Issue), page range.
2. Example:
	* Yılmaz, Z., & Karaca, M. (2020). Üretim planlamada sezgisel algoritmaların karşılaştırılması. *Endüstri Mühendisliği Dergisi*, 33(2), 115–128.

**Internet Source:**

1. Organization/Author. (Year, Day Month). Title of the page. *Website Name*. URL
2. Example:
	* T.C. Ministry of Industry and Technology. (2022, April 15). *Digital transformation report*. https://www.sanayi.gov.tr/dijitaldonusum

**Thesis:**

* Surname, A. A. (Year). *Title of the thesis* (Unpublished bachelor's/master's/doctoral thesis). Name of the University.
* Example:
	+ Aksoy, S. (2021). *Decision support model for smart production systems* (Unpublished master’s thesis). Istanbul 2 University.

# **METHODOLOGY**

The Methodology section forms the backbone of a thesis, as it clearly demonstrates how the study was conducted. It provides detailed explanations of the methods, tools, and procedures used to carry out the research. This section should enable the reader to understand the scientific validity, process flow, and approach adopted throughout the study.

This section typically consists of the following subheadings[[1]](#footnote-1):

1. Research Method (Approach): This part explains the overall research methodology used in the study:
2. Was a qualitative, quantitative, or mixed-method approach applied?
3. Was the research descriptive, experimental, or a case study?
4. The reasons for choosing a particular method must be clearly justified based on the nature and goals of the study.
5. Model Definition / Problem Statement: If the study is based on a mathematical model, algorithm, or system, this section should present a detailed problem definition and describe the structure of the model.
	1. What are the decision variables?
	2. How are the objective function and constraints defined?
	3. What are the assumptions made during modeling?
6. Data Collection Process This section describes the type, source, and method of acquisition of the data used:
	1. Was the data based on a survey?
	2. Was it obtained from a real organization?
	3. Were existing datasets used?
	4. Additionally, it should mention the tools and procedures followed during data collection (e.g., survey forms, observation sheets, software tools, etc.).
7. Methods / Techniques / Tools Used: This section explains the analytical or solution techniques and software tools employed in the study.
8. If applicable, methods such as optimization, simulation, regression, decision trees, AHP, TOPSIS, artificial neural networks, etc., should be explained in detail.
9. The software tools used (e.g., Excel Solver, Gurobi, Python, SPSS, Arena, etc.) must be clearly stated.
10. The reasons for selecting these methods and how they were applied within the study must also be clarified.
11. Analysis Plan and Implementation Steps: This section outlines the step-by-step process of the study’s execution. It is especially important in practical or application-based projects.

Example:

1. Data was collected
2. The model was developed
3. Optimization was applied
4. Results were compared
5. Interpretations were made
6. Assumptions and Limitations: This section identifies the key assumptions, limitations, or external factors considered during the study. These elements have a direct impact on the interpretation of the results and should be clearly stated.

## **3.1. Definition of the Mathematical Model**

Mathematical models are a way to represent a problem in numerical and symbolic form. Before presenting the model, it must be clearly stated what the model represents and for what purpose it was developed. All decision variables, parameters, and constants used in the model should be properly introduced. These definitions enhance the readability and interpretability of the model. For example, the sets and parameters used in the model can be defined as shown in the sample table below.

**Table 3.** Table of Sets and Parameters

|  |  |
| --- | --- |
| **Sets/Parameter** | **Description** |
|  | Index and set of factories |
|  | Index and set of customers |
|  | Distance between points and  |
|  | Cost between points and  |
|  | Demand of customer |
|  | Capacity of factory  |

The definitions of the model variables can be presented either within the text or in the form of a table, depending on the size and complexity of the model. The type of each decision variable must be specified, whether it is continuous, integer, or binary (0–1).

All mathematical expressions and necessary notation definitions should be written using the Equation feature in MS Word. This tool can be accessed as shown in the figure below.



(a)



(b)

**Figure 4.** Equations into an MS Word Document: (a) Opening the Equation Tab and (b) Tools Available for Adding Equations

The main objective targeted by the model should be clearly formulated—such as cost minimization, profit maximization, or time saving. To ensure the model’s validity, the necessary rules and constraints must be explicitly defined. It is recommended to provide a brief explanation under each constraint. Once the full model has been written, all functions and constraints should be presented neatly and coherently. Numbering the constraints significantly improves readability and facilitates referencing during model analysis. All constraints included in the mathematical model must be numbered, typically in ascending order within parentheses (e.g., (1), (2), (3)...). This allows for easy referencing of a specific constraint in the text and ensures clarity during analyses such as sensitivity testing or constraint relaxation.

Each constraint should be followed by a concise explanation of its purpose and meaning. These explanations help the reader understand the model not only from a technical perspective but also from a conceptual standpoint. When multiple constraints share a similar structure, these explanations are particularly important for highlighting the differences.

Finally, it is preferable to present the mathematical model in closed form, showing all components together in a structured format.

* Constraint numbers should be placed on the right-hand side of each equation line and enclosed in parentheses.
* A brief but clear explanation should be provided below each constraint. If necessary, the explanation may span 2-3 lines.
* These explanations can be written in either italic or regular font.
* When referencing constraints in the following sections of the study, their numbers should be used. Example: “Constraint (2) ensures that each agent is assigned to only one task.”

An example mathematical model can be presented as follows.

**Table 4.** Definitions of Sets and Parameters Used in the Model

|  |  |
| --- | --- |
| **Sets/Parameter** | **Description** |
|  | Index and set of warehouses |
|  | Index and set of retailers |
|  | Unit transportation cost from warehouse to retailer  |
|  | Capacity of warehouse |
|  | Demand of retailer |

The quantity of goods to be transported from warehouse to retailer is denoted by

|  |  |
| --- | --- |
|  | (1) |
| Subject to |  |
|  | (2) |
|  | (3) |
|  | (4) |

Constraint (1) represents the objective function of the mathematical model, indicating that the transportation cost is to be minimized. Constraint (2) ensures that the total shipments from each factory do not exceed its capacity, while Constraint (3) ensures that the demand of each customer (i.e., retailer) is fully satisfied. Constraint (4) defines the possible values that the decision variable can take.

The chosen method should be clearly justified by explaining why it was preferred over alternative approaches. Highlighting its advantages helps demonstrate how it contributes to the study.
Regardless of the chosen methodology, whether mathematical modeling, simulation, machine learning, or multi-criteria decision making, its implementation must be explained step by step.
If necessary, the explanation can be supported with an algorithm box or a flowchart to enhance clarity.

# **RESULTS AND ANALYSES**

This section should not only present the results obtained but also explain what those results mean, what they indicate, and why they are important. Numerical values alone are not sufficient; each data point must be interpreted within its context to derive meaningful insights.

To demonstrate the effectiveness of the model or method, the results should—where possible—be compared with existing methods, findings from the literature, or the initial (baseline) state. Vague or generic statements should be avoided; instead, explanations should be supported by concrete numerical values. The use of statistical measures such as percentages, ratios, averages, and standard deviations will help improve the reader’s understanding.

Presenting results using visual tools greatly enhances clarity and comprehension. However, certain rules should be followed when using visuals:

* Tables:
	+ Best suited for the comparative presentation of numerical data.
	+ The table title should be placed above the table and numbered (e.g., Table 3. Simulation Results).
	+ Data should be presented in a clear and readable format.
* Graphs (bar, line, pie, etc.):
	+ Used to show trends, comparisons, or distributions.
	+ A figure caption must be placed below the graph, and it must be referenced within the text (e.g., “as shown in Figure 4”).
	+ Axis labels, units, and explanations must always be included.
* Figures:
	+ Can be used to represent model structures, system diagrams, or process flows.
	+ Figures should be of sufficient resolution and have a clean and simple layout.

Visual elements should not be included solely for aesthetic purposes. Each table or figure must be explained within the text, with a clear statement of what it represents and why it matters.

If the study includes multiple types of analysis (e.g., cost analysis, time analysis, performance comparison), organizing these under subheadings will help readers navigate the section more easily.

Finally, interpretations must be objective, based on data and technical evidence, and may be supported by relevant literature where necessary.

# **CONCLUSION**

The conclusion section provides a comprehensive summary of the study, explains the significance of the findings, and highlights the contributions of the research. It should begin with a clear and concise summary of the problem addressed, the methods employed, and the results obtained. If numerical results were achieved, these values should be explicitly stated, and comparisons with existing systems should be made where applicable. Following this, the implications of the results should be discussed, how they contribute to practical applications or support the theoretical literature. Additionally, the limitations of the study should be briefly mentioned, along with suggestions on how these limitations might be addressed in future work. Finally, a section commonly referred to as “Future Work” should be included, outlining potential areas for improvement, alternative methods that could be applied, or ways the model could be tested using different datasets. In this way, the conclusion not only summarizes the study but also serves as a guide for future research.

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