

## **CHAPTER IV**

### **RESULTS AND DISCUSSION**

#### **4.1 Result**

According to Borg and Gall (1983), the Research and Development (R&D) method is a research approach designed to develop and validate educational products through systematic steps, including planning, development, preliminary testing, revisions, and implementation. In this study, the R&D method was applied to develop a product in the form of a Telecommunication Glossary intended to support technical translation activities at the Ministry of Communication and Digital Affairs of the Republic of Indonesia. The development process was conducted in several stages, including potential and problem identification, preliminary data collection, product design, design validation, product revision, field testing, and finalization.

This study adopted Borg and Gall's R&D model by adjusting its stages to fit the context of glossary-based media development. The researcher designed the content and visual layout of the glossary based on actual terminology extracted from technical documents, followed by validation from content and media experts, and revisions based on feedback from operational field testing. Each stage was designed to ensure that the

final product was not only academically sound but also practical for use in a professional setting.

#### 4.1.1 The Process of Creating Glossary

The process of creating the Telecommunication Glossary was carefully structured using the Research and Development (R&D) method to ensure its effectiveness and practical relevance. This glossary was designed to assist translators, technical staff, and policymakers within the Ministry of Communication and Digital Affairs, Republic of Indonesia, in translating and interpreting telecommunication terms accurately. The entire development process began with identifying the practical translation challenges faced by the Ministry. Through comprehensive needs analysis, the researcher determined that existing translation resources were insufficient in covering the dynamic and complex terminology used in the telecommunications sector. This realization reinforced the necessity of compiling an accessible glossary that aligns with national and international standards. As an applied linguistic resource, the glossary was envisioned not only as a dictionary but also as an educational tool that supports consistency in official documents. By integrating theoretical research with practical field data, this project bridges the gap between academic study and professional application. The glossary format further supports international communication by providing precise equivalents in Indonesian and English. This aspect ensures that the terminology used in policies, agreements, and official correspondence maintains

accuracy and clarity across languages. Overall, the project aims to strengthen the Ministry's capacity to participate in global digital discourse effectively.

Table 4. 1 Report of the Development Glossary

No.	Title of the Report	Source
1.	Strengthening ITU's Regional Presence	ITU Council
2.	Action Plan (ITU-D Priorities and their Enablers)	APT World Telecommunication Development Conferences (WTDC)
3.	Update on the Union's headquarters premises project	ITU Council Working Group (CWG)
4.	Report on the implementation of the Strategic Plan and the activities of the Union	ITU-D
5.	Suggestions on ITU Leveraging Its Advantages and Enhancing Its Synergy in Promoting AI for Sustainable Development Goals	ITU CWG-WSIS
6.	Strengthening ITU's Regional Presence, Report by the Secretary-General	ITU CWG-FHR

7. Measuring digital development - Facts and ITU-D Publication  
Figures 2024

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The distribution of the reports is designed to maintain content proportionality and facilitate easy navigation for readers searching for terms in alphabetical order. In the development, seven reports are used to arrange the glossary of telecommunication.

The step-by-step creation process was divided into several phases, beginning with extensive research and information gathering to identify the core challenges in translating technical telecommunications terminology. This phase was crucial for understanding the Ministry's operational needs and the frequency of specific terms within official documents. Once data was collected, the researcher proceeded with the planning phase, which included designing the visual and structural framework of the glossary. During this stage, decisions regarding the glossary's format, layout, color scheme, typography, and user interface were made to align with the Ministry's branding. The planning phase also focused on content development, ensuring that each entry would provide clear definitions, relevant contexts, and examples of use within telecommunications policies. The glossary approach required extra attention to ensure precise equivalence and avoid misinterpretation between languages. Furthermore, the guidebook was planned to be accessible in both printed and digital formats to ensure usability in various conditions. The incorporation of a keyword search feature in the

digital version was also conceptualized during this phase. This comprehensive planning process laid a solid foundation for the subsequent stages of prototype development and revision.

Overall, the process reflects a commitment to combining theoretical research, practical feedback, and technological design to create a robust translation aid. Each step was carefully documented to ensure transparency and replicability for future lexicographic projects within the Ministry. The emphasis on bilingual accuracy and user-friendliness highlights the innovative aspect of this glossary compared to conventional glossaries. By involving stakeholders throughout the process, the researcher ensured that the final product would address real-world translation challenges and meet professional standards. The final version aims to contribute not only to the Ministry's internal capacity but also to Indonesia's engagement in global telecommunications policy. The glossary's practical design, comprehensive content, and technological integration are expected to serve as a model for similar initiatives in other specialized fields. In the long term, the successful implementation of this glossary may encourage further research and development of bilingual technical glossaries to support other government agencies and professional translators. Thus, the glossary is not merely an academic output but a practical tool for empowering effective communication in the digital era.

#### 4.1.1.1 Research and Information Data Collection

The first phase, research and information data collection, served as the foundation for developing the bilingual glossary. During this stage, the researcher

conducted an in-depth analysis of relevant literature, previous studies, and regulatory documents issued by the Ministry of Communication and Digital Affairs. This process provided insights into the types of telecommunication terms frequently used their translation. To complement the literature review, semi-structured interviews were conducted with technical staff who handle international correspondence and policy documents on a daily basis. On ninth May 2025, the time of the interview, these interviews aimed to capture practical challenges, preferences, and common issues faced when translating technical terms. Document analysis was also carried out using official reports, agreements, and archives to ensure the glossary entries reflect real-world usage and contexts. All data collected was systematically organized, coded, and categorized by thematic relevance to support the next phase. This stage ensured that the developed glossary would not only be theoretically sound but also practically useful. By aligning theoretical findings with actual field data, the glossary is expected to address the precise translation needs of the Ministry effectively.

The research and information gathering phase was not limited to internal sources but also expanded to include international references to ensure that the glossary aligns with global standards. By referring to terminology guidelines from the International Telecommunication Union (ITU) and relevant ASEAN digital cooperation documents, the researcher cross-checked term usage and definitions commonly found in transnational communications. This ensured that each term included in the glossary would have accurate equivalents acceptable in both Indonesian and international contexts. Additionally, feedback from expert consultations

contributed to identifying terms that are often misunderstood or mistranslated due to their technical nature. All findings were recorded in detailed notes and organized into thematic clusters, such as infrastructure, policy, cybersecurity, and emerging technologies. This classification allows the glossary to be user-friendly and logically structured. Furthermore, the integration of real-life usage examples from Ministry documents provides practical context for each term, helping users understand not just the literal translation but also its appropriate application. This holistic data collection approach strengthens the glossary's function as a reliable reference for consistent translation.

By the end of this phase, the collected data formed a strong foundation for the next steps of planning and prototype development. The researcher compiled an initial list of key telecommunication terms that appeared frequently but showed inconsistent translations in policy drafts and official reports. These entries were prioritized for inclusion in the initial draft of the glossary. To ensure transparency and academic rigor, all data sources, interview transcripts, and document analysis results were catalogued and archived for verification. The thematic clusters were then shared with subject matter experts to validate the relevance and accuracy of the selected terms. This collaboration also enabled the identification of any additional terminology gaps that might hinder effective communication within the Ministry. With clear data-supported justifications, the project moved forward to the planning stage, where this raw information would be transformed into a well-structured, user-oriented bilingual

glossary. Ultimately, this meticulous research phase confirmed that the glossary would directly address the Ministry's operational translation needs while supporting Indonesia's commitment to international digital collaboration.

#### 4.1.1.2 Planning

After the data has been collected, the next step involves designing the product.

This stage is divided into several phases:

##### a. Processing Research Data

The creation of a glossary is adjusted to the needs of the target that has been determined. With the description that the book will be made in English and Indonesian and contains a conversation between a staff and head who provides international meeting at the international affairs area. In this stage, observations, interviews, and documentation were conducted with staff and head on duty at International Affairs. The observation period lasted for two months, followed by interviews with 3 staff of International Affairs: Yusuf Akbar Hasan (Y.A.H) as *Staff Analisis Kebijakan*, Annissa Aprilia Riesky (A.A.R) as *Staff Penalaah Teknis Kebijakan*, and Minati Dwi Rahayu (M.D.R) as *Staff Penyusun Bahan Kerjasama*. The interviews, conducted in Bahasa Indonesia with 6 questions; however, since a sample of the interview data will be included in the report, both the questions and answers will be presented in English. For the complete interview results in the original language can be seen on Appendix 2.

Table 4. 2 Structured Interview Question

No.	Interview Questions
1.	Can you describe your experience translating technical terms in international documents in the fields of radiocommunication, standardization, or development?
2.	What challenges do you most often face when understanding or conveying foreign terms related to radiocommunication, standardization, or development?
3.	How do you usually ensure accuracy when translating technical or specialized terms or concepts?
4.	Have you ever encountered a specific term whose meaning was unclear? Can you explain?
5.	Are there any sources or references that help you the most in understanding technical terms related to telecommunications, standardization, or development?
6.	In your opinion, is there a need for or innovation for a specific tool or medium to help translate such terms?

From these interviews, data as described above was obtained

Table 4. 3 Sample of Semi-structured Interview Answer

No.	Name	Question Number	Answer
1.	Y.A.H	1	One of my experiences was translating the final document of the World Radiocommunication Conference 2023. The document is the outcome of a global meeting that determines the direction of

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radiocommunication frequency usage worldwide. For example, the assignment of specific frequency ranges to particular services must be harmonized across countries to prevent interference.

In translating these technical documents, two main challenges arise. First, aligning interpretations among those involved in the translation process takes a considerable amount of time. Second, even minor discrepancies in punctuation or wording can significantly alter the meaning of a document. Therefore, extreme caution is necessary when translating such texts.

2 We need to transfer translation knowledge effectively because these tasks require certified translators (sworn translators) who specialize in telecommunications. Many terms are exclusive to this field. Additionally, aligning interpretation takes time. We must understand both the technical meaning and its application within the broader context of the document.

3 First, the process must involve a technical team that deals with the subject on a daily basis. If the writing aligns with

the intended meaning, then it is considered accurate. Second, we need experts in telecommunications. Third, we consult the original document and, if necessary, request clarification from the document's issuer.

4 When translating, we often need to look deeper into phrases rather than translating them word for word. Understanding the context and intent is crucial for producing an accurate translation.

5 First, the simplest references are official dictionaries such as KBBI, Oxford, or Webster. Second, documents are often embedded within broader regulations and can be referred to when changes occur. Third, definitions are sometimes provided only within the specific document in which they are used. Fourth, we invite technical work units for discussions. Fifth, we consult both language and radiocommunication experts. Lastly, we may consult directly with international organizations, such as the ITU.

6 If there were media, the process would speed up significantly. It would also

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make the communications sector more adaptive and responsive to rapid change.

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After obtaining interview data from nine staff members and heads of international affairs at the Ministry of Communication and Digital, the researcher conducted a data processing stage to compile the basic contents of the glossary. This process involved compiling the interview results into thematic tables that covered experiences, obstacles, and suggestions for the need for technical translation aids. Through this data processing, it was found that most respondents faced difficulties in understanding foreign technical terms, particularly in documents originating from international forums, such as the International Telecommunication Union (ITU), reports from the ITU website are selected as development sector-focused. Additionally, harmonizing perceptions between translators is a challenge in itself, as it can lead to inconsistencies due to the absence of standardized guidelines.

Based on these findings, we grouped the key terms frequently mentioned in the interviews into several main categories, including radiocommunication, standardization, and development. Each term was then traced to its occurrence in official ministry documents and checked for its English and Indonesian equivalents. At this stage, researchers also noted terms that lacked consistent equivalents or experienced variations in translation across documents. These findings served as the basis for

compiling an initial list of glossary entries, which were then formulated with definitions, contexts of use, and example sentences.

The data processing process also involved expert validation. Researchers coordinated with sworn translators from Resources Management and Equipment of Posts and Informatics (SDPPI) division, specialist staff from the international affairs, and supervisors to ensure that the chosen terms were truly relevant to the Ministry's needs. A triangulation approach was employed to enhance data reliability by comparing the results of interviews, document analysis, and literature review. Thus, the data processing in the planning stage became the primary foundation for the content of the glossary, which aimed to address practical needs while adhering to academic and professional standards.

b. Material Content Drafting

The drafting of glossary content is a critical phase that serves as the core of this glossary development project. Based on the previously processed data and interviews with staff and experts at the Ministry of Communication and Digital Affairs, the researcher identified and classified the glossary entries into several thematic categories. One of the main categories is Development (D), which includes terms related to the development of telecommunication infrastructure and digital technology.

In this category, a total of 75 terms were curated from official documents, including ITU Reports and ITU-D Activities. Each entry

consists of: the term in English as the source language, its Indonesian equivalent as the target language, the category code (D for Development), bilingual definitions, and one example sentence that reflects the real-life usage of the term. For example, the term "Access network" is translated as "*Jaringan akses terakhir (kepada pelanggan)*," accompanied by definitions and contextualized examples. The term selection is guided by the KBBI and the official translation practices used by the Ministry of Communication and Digital Affairs, ensuring terminological accuracy and professional acceptability. The glossary's tabular format also features a systematic bilingual layout, helping users easily compare and understand both language versions of each entry.

**Development/Pengembangan (D)**

No.	Source Language (EN)	Target Language (IDN)	Kode (R/S/D)	Definisi B.Ind & B.Ing	Contoh Kalimat
A					
1.	Access network	Jaringan akses terakhir (kepada pelanggan)	D		
2.	Adaptive systems	Sistem penyesuaian otomatis	D		A
B					
3.	Backhaul	Jaringan penghubung antar simpul utama	D		

Figure 4. 1 Before Making Entry List for The Glossary

**Development/Pengembangan (D)**

No.	Source Language (EN)	Target Language (IDN)	Kode (R/S/D)	Definisi B.Ind & B.Ing	Contoh Kalimat
<b>A</b>					
1.	Access network	Jaringan akses terakhir (kepada pelanggan)	D	The final connection layer to users  Sistem penghubung akhir ke pelanggan	<b>Access networks</b> allow direct internet connection to users.  <b>Jaringan akses terakhir</b> yang memungkinkan koneksi internet langsung ke pengguna.  Source: Report ITU
2.	Adaptive systems	Sistem penyesuaian otomatis	D	Technology that adjusts itself automatically  Teknologi yang menyesuaikan secara otomatis	<b>Adaptive systems</b> are used in 5G for signal stability.  <b>Sistem penyesuaian otomatis</b> digunakan dalam jaringan 5G untuk stabilitas sinyal.  Source: Report ITU
<b>B</b>					
3.	Backhaul	Jaringan penghubung antar simpul utama	D	Backbone network connection  Jalur utama penghubung antara pusat jaringan	<b>Backhaul</b> supports data traffic from BTS to core network.  <b>Jaringan penghubung antar simpul utama</b> mendukung lalu lintas data dari BTS ke pusat.

Figure 4. 2 After Making Entry List for The Glossary

The Development category was chosen as the primary focus as it reflects the current issues in national digitization being developed by the Ministry of Communications and Digital. Terms in this category are technical and strategic, and frequently appear in international documents such as ITU Reports or ITU-D Activities. Each term was selected based on its recurrence and urgency in the context of Komdigi's work, and has been adjusted to the official terminology commonly used in Komdigi's policies, press releases, and training documents. A detailed explanation of each term follows:

1. Access Network (*Jaringan Akses Terakhir kepada pelanggan*)

The term “Access Network” is officially used in ITU documents as part of the digital infrastructure structure. In the Indonesian context, the equivalent term “*Jaringan Akses Terakhir (kepada pelanggan)*” was selected to clarify the network’s primary

function, which is to connect the service provider to the end user. This translation aligns with terminology used by the Ministry of Communication and Digital Affairs, especially in rural internet projects that emphasize final-layer connectivity. The phrase “*kepada pelanggan*” (to the customer) was added to ensure semantic clarity and avoid confusion with internal distribution networks.

2. Bandwidth (*Lebar Pita Frekuensi*)

Bandwidth is translated as “*Lebar Pita Frekuensi*,” which is a standardized term in Komdigi’s technical and regulatory documents. The use of “*frekuensi*” emphasizes its relation to wireless communication and digital data transmission. This translation is also consistent with the National Frequency Master Plan. Therefore, it maintains alignment with both Indonesian regulations and ITU terminology.

3. Beamforming (*Pengarahan Sinyal Antena*)

Beamforming refers to a technology that efficiently directs signals to target devices. The translation “*Pengarahan Sinyal Antena*” directly explains the technical action taking place. In Komdigi’s 5G strategy documents, this term is used to describe transmission efficiency mechanisms. The use of “*pengarahan*”

(directional control) clarifies that the process is the result of innovative antenna technology, not just ordinary signal focusing.

Thus, the preparation of glossary material in the Development category is carried out systematically, considering term equivalents that are not only linguistically appropriate but also in line with the terminology standards used by the Ministry of Communications and Digital, as well as international institutions such as the ITU. Each entry is organized based on consideration of its context of use, equivalence of meaning, and acceptability of the term in a professional environment. Through this approach, the resulting glossary is expected to be a practical and reliable reference in supporting the translation of technical documents in the field of telecommunications.

c. Translation

The translation process in this project was carried out gradually and carefully, taking into account the terminological, semantic, and functional aspects of each term classified under the Development category. The researcher employed a semantic-communicative translation approach to ensure meaning equivalence while preserving the specific context of each term in the telecommunication field. This approach was considered the most appropriate, as it accommodates both the technical and linguistic needs of the intended users of the glossary. During the translation process, the researcher did not rely solely on linguistic intuition but also referred to

trusted lexical references. These included the Oxford Learner's Dictionary and the Cambridge Dictionary to confirm the lexical meanings in English. In addition, the researcher utilized translation support tools, such as DeepL Translator, to find more natural translation alternatives and Grammarly, to ensure that the sentence structure and grammar within the definitions and example sentences adhered to proper academic standards.

Each term in the Development category, such as Backhaul, Bandwidth, Beamforming, and Bitrate, was translated with attention to technical acceptability in Indonesian. The equivalent terms were also adjusted to comply with the linguistic rules of the *Kamus Besar Bahasa Indonesia* (KBBI) and the official language regulations used by the Ministry of Communication and Digital Affairs. All translation results were revalidated by cross-referencing them with official documents issued by the ITU and internal ministry publications to ensure terminological consistency and accuracy. The final translation output included not only bilingual term equivalents but also bilingual definitions and example sentences that reflect actual usage. Thus, the glossary is expected to serve as a practical translation aid, particularly for professional translators, technical staff, and ministry personnel engaged in multilingual communication in the field of telecommunications.

#### d. Glossary Design Formatting

In the final stage, the glossary design was focused on creating a compact and portable layout while maintaining sufficient size to ensure readability. Appropriate colors were chosen, and the layout was arranged to present the dialogues clearly and facilitate user navigation. This stage was considered essential to ensure that the glossary would be both practical and user-friendly.

#### 1) Color Palette Selecting

The Colour Palette in this design glossary represents the characteristic colours of the Ministry of Communication and the Digital Republic of Indonesia, focusing on the development of the telecommunication sector, namely blue and yellow. The use of distinctive colors, blue and yellow, aims to convey a defining impression that this glossary embodies the identity of the Ministry of Communication and the Digital Republic of Indonesia. The color palette used in the glossary is as follows:



Figure 4. 3 Color Palatte for The Glossary

As illustrated in Figure 4.3, two monochromatic colour palettes were chosen and applied to the design of the guidebook, such as the development sector: a blue palette and a yellow palette. The blue palette consists of seven gradient tones ranging from light

blue (#17abe3) to deep navy blue (#204e9d). Blue was selected due to its strong association with technology, professionalism, and trust. In the context of digital communication and telecommunication, the color blue evokes a sense of stability and reliability, making it ideal for sections of the glossary that convey technical and informative content.

On the other hand, the yellow palette also consists of seven shades, ranging from dark yellow (#edbc1d) to soft cream yellow (#FFFDEA). Yellow was chosen for its cheerful, friendly, and attention-grabbing qualities. This palette was used in parts of the guidebook designed to engage the reader, such as interactive and educational pages. The selection of both color palettes was not solely based on aesthetics but also visual clarity, text legibility, and consistency throughout the layout of the guidebook.

## 2) Font Selecting

For font selection, there is just one font to use in writing. The font, "Montserrat," is used for the book title on the glossary cover page. This font has minimalist and formal characteristics, making it suitable for writing glossary with a formal theme and giving a firm impression.

## 3) Font Size Selecting

Various font sizes are used in writing the content of the guidebook. A size 12 font is used for the main content of the material, while a size 14 font is used for the titles on the cover and the title of the glossary. Determining the appropriate font size is crucial, as it can affect the readability of the guidebook's contents. If the chosen font is too large, it may disturb the reader's comfort; if the font size is too small, it can make reading difficult. Therefore, selecting the correct font size is crucial for enhancing the reading experience of guidebook users.

#### 4) Glossary Size Selecting

In creating this guidebook, an A5 size with dimensions of 21 x 14.8 cm was chosen. The A5 size was selected for its practicality, simplicity, and ease of portability. This design will make it easier for staff, interns, and the head of Pusat KI, as the glossary will be convenient to carry. Additionally, using the A5 size format ensures that the number of book pages and the thickness of the book will not be too thin or too thick.

#### 5) Designing Process

The cover of the Telecommunication Glossary was designed entirely in Adobe InDesign, as the software offered advanced typographic controls, accurate colour management, and



both a visual metaphor for information flow and a divider between the title area and the illustration. A blue gradient hexagonal pattern was applied to the lower background to amplify the technological atmosphere and maintain legibility of the “2025 Edition” label and the authors’ names.

The cover was subsequently printed as a glossy hardcover. This finishing choice enhanced physical durability, conveyed a premium appearance, and produced a subtle light reflection that accentuated komdigi’s corporate blue-and-yellow palette. All graphic assets originated from licensed image libraries; usage permissions were secured prior to production, ensuring the cover complied with academic ethics and copyright regulations.

#### 4.1.1.3 Develop Preliminary Form of Product

The third stage in the Research and Development method is the main phase in creating the bilingual glossary for airport customer service. At this stage, all the essential elements of the bilingual glossary will be explained.

##### a. Page Format

The page format in the Telecommunication Glossary has been systematically and professionally designed to support readability and facilitate user navigation of the glossary's contents. Each page in this book is organized consistently by considering aesthetic and functional aspects,

which can be seen from the use of uniform page structure, positioning of graphic elements, and neat information hierarchy.



Figure 4. 5 Page Format

The initial pages, such as Editorial Team, Acknowledgement, and Background, are placed sequentially and designed with a distinctive visual pattern of a blue-graded hexagonal background at the top and bottom of the page. These elements give a modern and futuristic impression that reflects

the field of telecommunications. The main headlines are set in bold, blue-colored blocks with white typography, creating a strong visual contrast that immediately catches the reader's attention.

Each of these initial pages features a single center text column with ample spacing, designed to provide visual breathing room for the reader, ensuring it does not feel crowded. In addition, each page also includes footer markers in the form of book titles and page numbers, which are placed in the bottom center position in bright blue.

TABLE OF CONTENTS	
Judul .....	I
Editorial Team .....	II
Acknowledgement .....	III
Background .....	IV
Table of Contents .....	V
RADIOCOMMUNICATION	
A .....	2
B .....	5
C .....	6
D .....	8
E .....	9
F .....	10
G .....	12
H .....	15
I .....	18
J .....	19
K .....	20
M .....	22
N .....	24
O .....	24
P .....	25
Q .....	26
R .....	27
S .....	28
T .....	30
U .....	31
V .....	32
W .....	33

STANDARDIZATION	
X .....	34
Y .....	34
Z .....	35
STANDARDIZATION	
A .....	37
B .....	39
C .....	40
D .....	43
E .....	44
F .....	45
G .....	45
H .....	46
I .....	47
J .....	48
K .....	48
L .....	49
M .....	50
N .....	52
O .....	52
P .....	53
Q .....	55
R .....	55
S .....	56
T .....	58
U .....	59
V .....	59
W .....	60
X .....	60
Y .....	61
Z .....	61

Handbook for Telecommunication

DEVELOPMENT	
A.....	63
B.....	64
C.....	66
D.....	68
E.....	69
F.....	69
G.....	70
H.....	71
I.....	72
J.....	73
K.....	73
L.....	74
M.....	76
N.....	77
O.....	78
P.....	79
Q.....	80
R.....	80
S.....	81
T.....	82
U.....	83
V.....	83
W.....	84
X.....	85
Y.....	85
Z.....	85
Appendix.....	86
Authors Profile.....	87
References.....	88

Figure 4. 6 Page Format for Table of Contents

One notable aspect of the page formatting was the division of the *Table of Contents* into three separate sections, each on a separate page. The decision to divide the contents section in this way was not without purpose. This structure was based on the organizational framework of the glossary's contributors, who came from three distinct divisions under the International Affairs for Communication and Digital Affairs (Komdigi). Each division made substantial contributions to the terminology, specifically within the area of telecommunication development.

Each division was responsible for a specific section of the glossary, depending on their expertise and specialization, such as Radiocommunication, Standardization, and Development. Due to the varying topics and the substantial number of terms contributed by each division, dividing the contents into three pages provided a well-structured

solution, allowing readers to navigate the material more easily according to their specific area of interest. Also emphasized the collaborative and multi-divisional approach in the glossary's development.

This separation also prevented information overload on a single page and supported visual comfort. The typography for the contents pages utilized a modern sans-serif font that was easy to read, featuring a structured numbering system that allowed for direct reference to the corresponding sections. Section titles such as Radiocommunication, Standardization, and Development were highlighted in bright yellow to distinguish the categories. At the same time, the alphabetical subheadings were arranged in sequence, indicating a systematic structure for the glossary entries.

With such a layout approach, the overall page format not only reflected editorial professionalism but also supported the primary function of the glossary as an academic and technical reference that could be accessed quickly and clearly.

b. Main content

At this stage, the main content section of the guidebook was developed with a focus on visual consistency, readability, and content relevance tailored to the institutional needs of the Ministry of Communication and Digital Affairs (Komdigi), International Institutional Center. The main glossary category, "Development" begins with a

dedicated divider page. This introductory layout features an image of modern skyscrapers symbolising technological advancement and digital infrastructure, which aligns with the glossary terms in this section. The dominant blue (#204e9d) and yellow (#FFFDEA) hues were preserved to maintain a coherent visual identity with the front cover.



Figure 4. 7 Cover Page for Development

All design components including typography, icons, and backgrounds were constructed using Adobe InDesign. Montserrat was used as the font applied for English and Indonesian text, respectively. Font sizes were proportionally adjusted for optimal readability: 12 pt for headings, 10 pt for body content, and 9 pt for page numbering.

Each glossary entry contains key components: bilingual definitions (English-Indonesian), example sentences, and cited sources (e.g., ITU Report). Background colours vary depending on the classification, with

blue used for primary terms and soft yellow for secondary terms, providing a clear visual distinction between categories. Supporting visuals, such as transparent hexagonal overlays and digital circuit lines, were included to reinforce the technological context.

The differentiation between English and Indonesian content was achieved through typographic styling: English sentences appear in bold, while Indonesian text is set in standard weight. This visual strategy enables readers to easily distinguish between languages at a glance, thereby enhancing the overall user experience. All of these elements were designed to reflect Komdigi's institutional role in leading the development of digital terminology at an international level.

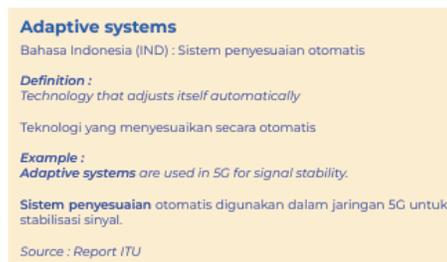


Figure 4. 8 Format of Glossary

The variation of colors for words like "adaptive" and "bandwidth", etc., served to highlight them as the main glossary entries. The text color was intentionally changed afterward to visually differentiate the glossary term from its definition or contextual explanation. This method enables readers to quickly identify key terms and distinguish them from supporting information. Additionally, each glossary entry includes an example

sentence that demonstrates how the term is used in real-world telecommunications contexts. Ensures that readers not only grasp the lexical meaning but also understand practical usage. These example sentences were taken from official documents such as ITU Reports, academic articles, or policies published by the Ministry of Communication and Digital Affairs of Indonesia, enhancing contextual validity and relevance.

The 75 terms selected under the Development category in this glossary were carefully curated based on the scope and terminology used by the International Telecommunication Union (ITU), particularly in publications related to digital transformation and the development of global telecommunications infrastructure. The selection was based on official ITU documents from 2018 to 2024, including those from the ITU Development Sector (ITU-D) and the World Telecommunication Development Conference (WTDC). The focus was placed on terms directly related to the advancement of telecommunication systems.

Each term was ensured to be relevant to the development sector, as it reflects processes, components, or technologies that support communication infrastructure and digital access worldwide. For instance, terms like Backhaul, Base Station, and Broadband represent the physical foundation of telecommunication systems, while Beamforming, Bitrate, and Bandwidth describe technical aspects that enhance efficiency and

equitable access. These terms were also selected to align with the terminology needs of Indonesia's Ministry of Communication and Digital Affairs (Komdigi), ensuring that the glossary serves as a practical translation aid for institutional use.

Thus, the selection of these 75 terms was not random but based on terminological research aligned with the development field in the global telecommunications sector. The terminology choices support the goals of digital literacy and communication policy development in Indonesia. The validity of the terms was further supported by technical dictionaries, institutional documentation, and official Indonesian equivalents sourced from KBBI and government translation references.

#### 4.1.1.4 Preliminary Field Testing

The supervisor tested the product. During the field test, there were several aspects of improvement. Figure 4.9 and 4.10 show the result of media and material evaluation form by the supervisor:

**FORM OF VALIDATION OF PRODUCT**

Creating a Handbook-based Telecommunication Glossary as a translation aid at  
Ministry of Communication and Digital Affairs Republic Indonesia

Validator: Windy Hariswi, S.Pd., M.Ist.Cel.  
Date: Tuesday, June 17, 2025

**Material Expert Validation**

**A. Filling Instructions:**

1. Place a checkmark (✓) in the provided column by selecting one of the five answer options.

SD	D	N	A	SA
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

2. If your assessment is Strongly Disagree (SD), Disagree (D), or Neutral (N), please provide comments and suggestions for improvement.

3. Place a checkmark (✓) to select the conclusion based on the results of this material validation assessment.

**B. List of Statement**

No.	Statements	Rating Scale				
		SD	D	N	A	SA
<b>A. Material Relevance</b>						
1.	Is the glossary relevant to the telecommunication field?					✓
2.	Are the selected terms suitable to the translation needs in the Ministry?				✓	
3.	Does the glossary meet national or international terminology standards?			✓		
4.	Are the definitions presented in clear and understandable language?					✓

**B. Language Use**

8.	Does the glossary provide both English and Indonesian equivalents?					✓
9.	Are the translated terms in Indonesian appropriate in their usage context?			✓		
10.	Is the language used in the glossary effective and efficient?			✓		
11.	Are the terms consistently written according to International Standard Terminology writing rules?			✓		
12.	Does the glossary avoid potential meaning errors due to unclear or ambiguous terms?					✓

**C. Comments**

**D. Suggestions**

LIST OF POSSIBLE ERRORS	SUGGESTIONS
None	None with the source can be fully. (rather without :)

**E. Result**

The Telecommunication Glossary Handbook material is feasible to be tested.

The Telecommunication Glossary Handbook material is feasible to be tested with revisions.

The Telecommunication Glossary Handbook material is not feasible to be tested without revisions.

Semarang, June 17, 2025  
Validator,  
  
Windy Hariswi, S.Pd., M.Ist.Cel.

Figure 4. 9 Material Expert form Validation

**FORM OF VALIDATION OF PRODUCT**

Creating a Handbook-based Telecommunication Glossary as a translation aid at  
Ministry of Communication and Digital Affairs Republik Indonesia

Validator: Widy Harniwi, S.Pd., M.Ind.Cul.

Date: Tuesday, June 17<sup>th</sup> 2025

**Media Expert Validation**

**C. Filling Instructions:**

- Place a checkmark (☑) in the provided column by selecting one of the five answer options:

SD: Strongly Disagree	D: Disagree	N: Neutral	A: Agree	SA: Strongly Agree
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- If your assessment is Strongly Disagree (SD), Disagree (D), or Neutral (N), please provide comments and suggestions for improvement.
- Place a checkmark (☑) to select the conclusion based on the results of this material validation assessment.

**D. List of Statement**

No.	Statements	Rating Scale				
		SD	D	N	A	SA
<b>A. Design Visual</b>						
1.	Does the design of the glossary suitable for official use?				✓	
2.	Does the layout of the elements in the glossary make it easy to read and understand?					✓
3.	Are the color choices in the glossary clear, comfortable for the eyes, and not distracting for readers?					✓

4.	Do the font type and text size make the glossary easy to read and remain consistent on every page?			✓		
5.	Is the appearance of the glossary effective and comfortable to read both in digital and printed formats?			✓		
6.	Do the images or symbols used in the glossary help clarify the technical terms explained?		✓			
7.	Does the glossary cover represent the content and identity of the product well?					✓
<b>B. Product Feasibility</b>						
8.	Does the size and format of the handbook allow it to be printed in a easy-to-carry form?					✓
9.	Is this product easy to distribute digitally without requiring any additional special devices?			✓		
10.	Do both the PDF and printed versions of the glossary allow users to quickly and easily search for terms?					✓
11.	Does the arrangement of terms allow for future development or additions?					✓
12.	Is this product designed for continuous use and to remain relevant over time?					✓

**C. Comments**

**D. Suggestions**

LIST OF POSSIBLE ERRORS	SUGGESTIONS
font size	please make the font size bigger
image	don't use icons please make the English subtitles in italic
layout	not all the terms have images / symbols, please add some
order	please sort the brevity of the authors in the end of the book
definition	please make the definition part into image / image with more detail

**E. Result**

- The Telecommunication Glossary Handbook media is feasible for trial.
- The Telecommunication Glossary Handbook media is feasible for trial with revisions.
- The Telecommunication Glossary Handbook media is not feasible for trial without revisions.

Scoring: June 17<sup>th</sup> 2025

Validator:

*(Signature)*

Widy Harniwi, S.Pd., M.Ind.Cul.

Figure 4. 10 Media Expert form Validation

#### 4.1.1.5 Main Product Revision

Following the stages of content and media validation, as well as main field testing, the main product, the Telecommunication Glossary, underwent several revisions as part of its final refinement before implementation. These revisions were made based on input from validators. The primary objective of the revisions was to enhance readability, visual consistency, and clarity of the information presented in the media. One of the main reasons for the revision was to adjust the font size and visual layout to make them more user-friendly, particularly for public service staff who require quick access to the presented information. Additionally, several design elements, such as icons, illustrations, and formatting consistency, were refined to ensure a more professional and cohesive appearance throughout the glossary.

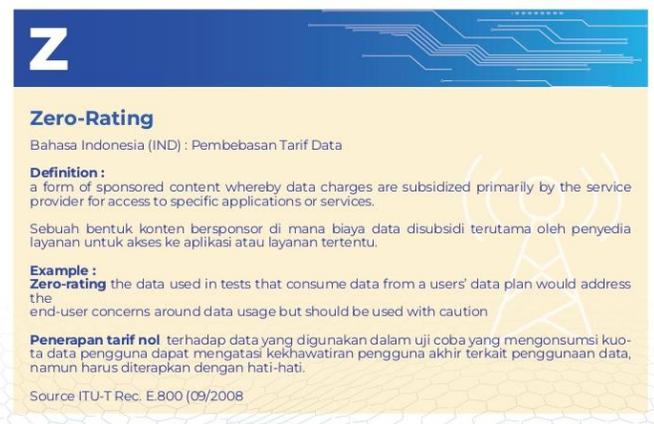


Figure 4. 11 Sample of Missing Italic Before Revision

**Zero-Rating**  
Bahasa Indonesia (IND) : Pembebasan Tarif Data

**Definition :**  
*a form of sponsored content whereby data charges are subsidized primarily by the service provider for access to specific applications or services.*

Sebuah bentuk konten bersponsor di mana biaya data disubsidi terutama oleh penyedia layanan untuk akses ke aplikasi atau layanan tertentu.

**Example :**  
*Zero-rating the data used in tests that consume data from a users' data plan would address the end-user concerns around data usage but should be used with caution*

**Penerapan tarif data** terhadap data yang digunakan dalam uji coba yang mengonsumsi kuota data pengguna dapat mengatasi kekhawatiran pengguna akhir terkait penggunaan data, namun harus diterapkan dengan hati-hati.

Source : ITU-T Rec. E.800 (09/2008)

Figure 4. 12 Sample of Missing Italic After Revision

In Figures 4.9 and 4.10, the italic formatting for the foreign or English sentences was missing. In both the definition and example sections, the English text was expected to be written in italics; however, it was not applied. Furthermore, in the “Source” section, a colon (:) was supposed to follow the word “Source,” and the entire citation was expected to be italicized, but these formatting elements were also absent.

The figure displays two versions of a 'TABLE OF CONTENTS' page for a 'Handbook for Telecommunication'. The left page, labeled 'Before', features a blue header with the title 'TABLE OF CONTENTS' and a yellow bar below it with the text 'RADIOCOMMUNICATION'. Below this, a list of letters from A to Z is shown, each followed by a dotted line and a page number ranging from 9 to 29. The right page, labeled 'After', has a similar header but includes a more detailed table of contents. It lists 'Judul' (I), 'Editorial Team' (II), 'Acknowledgement' (III), 'Background' (IV), and 'Table of Contents' (V). Below this is a yellow bar with 'RADIOCOMMUNICATION' and a list of letters from A to W, each followed by a dotted line and a page number ranging from 2 to 33. Both pages have a decorative background of circuit-like patterns.

Figure 4. 13 Before and After Table of Contents and Page Number

In addition to revisions related to font size and visual elements, one of the key improvements made to the main product was the inclusion of a complete and structured Table of Contents. In the previous version, the table of contents lacked accurate page numbers, making it difficult for readers to navigate the book's content. Furthermore, the central section title, background, and other elements that served as the introduction to the alphabetical glossary were not included in the table of contents, despite playing an essential role in organizing the glossary by thematic category. Therefore, in the revised version, the table of contents was updated to include precise page numbers. The full version of the main product revision was provided in Appendix 3.

#### 4.1.1.5 Main Product Testing

After compiling the expected book, the next step is to test the results of the compiled book at the stage of developing the preliminary form of the product. At this stage, tests are conducted related to the materials and media that have been compiled. The materials tested include aspects of the content and language used. In the media element, the validator will assess the display aspect of the glossary. During this stage, a validation sheet is provided to the lecturer as an examiner. The examiner's task is to test and review the products that have been created.

On the material validation sheet, the validator provided an assessment of the glossary's content based on the attached documents. The material presented in the telecommunication glossary was considered sufficient and appropriate for the intended target audience, which consisted of individuals seeking terminology references in the field of telecommunications. The validator acknowledged that the content met the users' needs in terms of depth, clarity, and contextual relevance. Moreover, the translation of terms from English to Indonesian was deemed satisfactory, showing that the meaning of each term was conveyed accurately and comprehensively.

However, the validator highlighted a critical point regarding the consistency of source notation. It was noted that the writing of sources in the glossary was not applied uniformly, particularly concerning the inconsistent use of colons (:) after the word "source." As a result, the validator recommended maintaining a consistent writing format throughout the entire glossary, either by including or omitting the colon, but in a uniform manner. Following this review, the validator concluded that the material was

feasible for testing, subject to revisions. This decision was confirmed by selecting the appropriate checkbox and signing the validation form, indicating that the glossary met the minimum standards required but still needed minor corrections to improve clarity and professionalism before broader use or implementation.

Next, the media validation process was conducted by the validator on the telecommunication glossary that had been developed. Based on the completed validation form, the validator provided several important inputs regarding the visual aspects and content of the media. One of the main points addressed was the font size, which was considered too small; therefore, it was suggested that it be enlarged to improve readability. In addition, the validator advised against using design elements such as ribbons and requested that English sentences be written in italic format to distinguish them from other language elements.

In terms of visuals, the validator observed that not all glossary terms were accompanied by relevant images or symbols. Hence, it was recommended to add supporting illustrations or icons to make the media more engaging and communicative. Furthermore, the validator suggested including a brief biography of the authors at the end of the book to provide recognition and clarity regarding the contributors' identities. From a content perspective, the definitions of terms were considered to require further emphasis by increasing the font size, particularly on the key terms being defined, so they could stand out and be more easily recognized by readers.

Based on this assessment, the validator concluded that the glossary was feasible for trial use, provided that revisions are made in response to the feedback provided.

This feasibility was confirmed by checking the option “feasible to use with revisions” on the validation form and signing the document as a formal endorsement of the evaluation results. This process demonstrated that the media had met most of the required feasibility criteria, yet still needed several improvements to reach its optimal quality before being implemented or distributed further.

At this stage, the revised glossary, which had been updated according to the validator’s input, was printed on art paper in A5 size (148 mm x 210 mm). A total of two printed copies were prepared for the operational field testing. These printed versions were distributed on July 02, 2025, directly to the designated recipients. One copy was handed over to the Head of the International Affairs Division. In contrast, the other copies were distributed to staff and intern personnel stationed in the waiting room and exhibition hall areas. Upon receiving the guidebooks, all recipients were requested to complete a questionnaire as part of the media evaluation process. During this testing phase, the respondents included the Head of Division of International Affairs, all active staff, and interns working in the International Affairs areas. These respondents were selected explicitly because the bilingual glossary was designed to support technical translation and terminology documentation at the Ministry of Communication and Digital Affairs. The feedback collected from these frontline users was expected to contribute meaningfully to the further improvement and refinement of the glossary media, thereby better meeting the operational needs of its intended users. The questionnaire is distributed online via Google Form which contains several statements.

Table 4. 4 List of Respondent

Company	Division	Occupation	Number of Respondent	
Ministry of Communication and Digital Republic of Indonesia	Centre of International Affairs	Head of Resources and Emerging Technologies Subdivision	1	
		Policy Analysts	5	
		Technical Policy Analysts	2	
		Cooperation Materials Staff	2	
		Administrative Staff	1	
		Intern Students	3	
		<b>Total Respondents</b>		<b>14</b>

In the operational field-testing stage, an assessment using a Likert scale is needed to simplify the process of determining the interval for each statement on each indicator. The score on the Likert scale is shown in the table below

Table 4. 5 Likert Scale Score Point

No	Criteria	Score
1	Strongly Disagree (SD)	1
2	Disagree (D)	2
3	Agree (A)	3
4	Strongly Agree (SA)	4

In finding the interval, formulas are needed as follows.

$$\text{Interval} = \text{Total Score} / \text{Total Respondents}$$

There are three Indicators to be considered at this stage, namely content, design (visual aspect), and translation aspects. The total number of statements in this questionnaire was 20. These statements are evident in Chapter 3. A Likert scale was utilized to analyze respondents' answers, generating interval data for the product assessment questionnaire of the bilingual glossary. The resulting interval data is presented in the table below.

Table 4. 6 Table of Respondent Interval

No	Statement	Average	Interval
1.	This glossary is relevant to the field of telecommunication, particularly in the sectors of Radiocommunication, Standardization, and Development.	3.71	Strongly Agree
2.	The selected terms in this glossary match the translation needs within the Ministry.	3.64	Strongly Agree
3.	This glossary adheres to terminology standards recognized at the national and international levels.	3.64	Strongly Agree

4.	This glossary's definitions are written in clear and understandable language for both general users and professionals.	3.57	Strongly Agree
5.	The definitions are accurate and align with the actual meaning of the terms in the context of telecommunication, particularly in radiocommunication, standardization, and development.	3.71	Strongly Agree
6.	This glossary provides equivalent terms in both English and Indonesian in a consistent and balanced manner.	3.57	Strongly Agree
7.	The Indonesian translations are appropriate and contextually accurate for technical and official documents.	3.64	Strongly Agree
8.	The language used in this glossary is effective and efficient for translation purposes.	3.57	Strongly Agree
9.	The terminology and definitions are consistently written and follow international terminology writing conventions.	3.93	Strongly Agree

10.	This glossary successfully avoids potential meaning errors caused by unclear or ambiguous terms.	3.71	Strongly Agree
11.	The glossary's design is suitable for official or institutional use.	3.71	Strongly Agree
12.	The layout of the elements in this glossary makes the content easy to read and understand.	3.64	Strongly Agree
13.	The color choices in this glossary are clear, comfortable for the eyes, and not distracting to readers.	3.79	Strongly Agree
14.	The font type and text size in this glossary make it easy to read and remain consistent throughout the pages.	3.64	Strongly Agree
15.	This glossary's appearance is effective and comfortable to read in both digital and printed formats.	3.71	Strongly Agree
16.	The glossary's images and symbols definitively clarify the technical terms.	3.64	Strongly Agree
17.	The cover of the glossary represents the content and identity of the product well.	3.71	Strongly Agree

18.	The glossary's compact and portable size and format make it suitable for printing.	3.64	Strongly Agree
19.	The glossary's design and layout make it a reliable professional reference in the telecommunications field.	3.64	Strongly Agree
20.	This glossary is a media product that is feasible to use and distribute to relevant institutions or stakeholders.	3.93	Strongly Agree

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The interval values indicate that the average of respondents are strongly agree with the statements. Among the assessment results, the smallest and largest interval values are notable. Specifically, for the 20th statement, “The terminology and definitions are consistently written and follow international terminology writing conventions”, 13 out of 14 respondents selected “strongly agree”, while the remaining respondents chose “agree”. Consequently, this 20th statement achieved an interval value of 3.93, representing the highest result in the questionnaire.

The lowest result in this questionnaire is observed in the 6th statement, “This glossary provides equivalent terms in both English and Indonesian in a consistent and balanced manner”. Here, 8 out of 14 respondents selected 'agree,' while the remaining respondents chose 'strongly agree,' resulting in an interval value of 3.57. Notably, both the highest and lowest interval values pertain to the linguistic aspect of the assessment.

Based on the open-ended questions in the questionnaire, the majority of respondents reacted positively, with comments like "all good" and "the product is well made." Based on this feedback, it is concluded that no changes or revisions to the product are necessary.

#### 4.1.1.6 Final Product Revision

At this stage, since there are no major revisions or changes from the respondents, then on August 11 the book will be given back to the Head of Resources and Emerging Technologies Subdivision. The book given to them will be implemented in the daily operations of.

#### 4.1.1.7 Dissemination and Implementation

Following a comprehensive development process that included multiple stages of validation and revision, the Telecommunication Glossary was officially registered for copyright protection. The registration process was carried out online through the official website of the Directorate General of Intellectual Property at [hakcipta.dgip.go.id](http://hakcipta.dgip.go.id). This copyright registration served not only to provide legal protection for the written work but also to fulfill an administrative requirement for graduation from the Applied Foreign Language Program at Diponegoro University. Upon successful registration, the glossary product received formal acknowledgment as a legally protected intellectual property.

At this stage, since the respondents suggested no major revisions during the operational field testing, the glossary was given to the Head of the Resources and Emerging Technologies Subdivision on August 11. The given glossary was scheduled

to be implemented in daily operations, notably to support effective communication and public service within the respective institutional environment.

## **4.2 Discussion**

The discussion stage of this research aims to analyze the correlation between the product development outcomes and the research objectives, while also assessing the practical relevance for the end users. The results from the development of the Telecommunication Glossary demonstrated that the product successfully met validation standards in terms of content, media, and implementation. Content validation revealed that the glossary material was suitable for the target users, specifically translators and technical staff at the Ministry of Communication and Digital Affairs of the Republic of Indonesia. The bilingual term translations were found to be accurate and contextually relevant, although some minor improvements were suggested regarding consistency in source formatting. Media validation highlighted design-related elements, such as font size and the use of supporting icons, recommending enhancements to achieve greater visual appeal and a professional presentation.

Operational field testing received highly positive feedback from users. The Likert-scale evaluations covering content, design, and translation aspects showed that most respondents strongly agreed with the statements regarding translation accuracy, design readability, and the glossary's relevance to their professional needs. No significant revisions were suggested, which signified that the product was ready for

institutional implementation. This product development process integrated theories from lexicography and technical translation with the practical needs of the institution. The glossary was constructed using empirical data, expert validation, and a visual design aligned with the institution's identity, proving that the final product fulfilled both academic standards and functional field requirements.

The findings of this study were consistent with previous research that emphasized the importance of glossaries as tools for terminology development and improving translation accuracy in technical fields. Earlier studies, demonstrated that glossaries helped reduce misinterpretation and accelerate the translation process (Rohani & Suyono, 2021; Maculan et al., 2023). However, the present research also contributed by highlighting the use of a glossary format, which had been rarely applied in the context of telecommunication glossaries. Therefore, this study did not contradict earlier research but rather expanded its scope by incorporating definitions, example sentences, visual illustrations, and relevant digital search features tailored to institutional needs.