



## Proposed Business Strategy in OTT-Dominated Era to Counter the Declining Interconnection Business of PT. Telkom Indonesia

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**ABSTRACT:** The telecommunication industry in Indonesia has experienced significant changes, largely driven by the rapid growth of Over-the-Top (OTT) services such as WhatsApp, Facebook Messenger, and Telegram. These platforms have drastically impacted consumer behaviour, shifting preferences from traditional voice and SMS services to internet-based communication methods. PT Telkom Indonesia, a dominant player in the Indonesian telecommunications sector, has seen a decline in its interconnection business revenue, primarily due to this technological shift and the competition from OTT services. The primary objective of this research is to assess the current state of PT Telkom Indonesia's interconnection business, identify the challenges and opportunities presented by the rise of OTT services, and propose effective business strategies to address the decline in traditional interconnection revenues. This study uses a qualitative research method, combining data from primary data which was gathered through in-depth interviews with key internal stakeholders. Secondary data came from industry reports, academic journals, financial statements, and regulatory documents. The research used various analytical tools like SWOT analysis, TOWS matrix, PESTEL analysis, Porter's Five Forces framework, and VRIO analysis. PT Telkom Indonesia's interconnection business has experienced a significant revenue decline of approximately 59.87%, dropping from IDR 4.76 trillion in 2018 to IDR 1.91 trillion in 2022. This decline is primarily due to the rise of OTT services, which offer cheaper and more flexible communication options than traditional interconnection services. External analysis using Porter's Five Forces revealed high competition from the technology transition from Time Division Multiplexing (TDM) to Internet Protocol (IP) based interconnection, along with a strong threat from OTT substitutes. PESTEL analysis highlighted significant regulatory, technological, and social factors affecting the business. Internal analysis with the VRIO framework showed PT Telkom Indonesia's strong infrastructure and large customer base but also identified a lack of innovation and agility in adapting to rapid market changes. The research concludes that PT Telkom Indonesia needs a comprehensive strategy to address the decline in its interconnection business. One of the initiative strategies for PT. Telkom Indonesia, due to the regulation about transition from Time-Division Multiplexing (TDM) to Internet Protocol (IP) based interconnection, is becoming an IP Hubber. By becoming IP Hubber, PT. Telkom Indonesia can leverage its existing infrastructure and expertise to maintain significant revenue from its interconnection business, especially in transit services, which are a major contributor to its current interconnection revenue. Investing in R&D is crucial to stay competitive, offer bundled services, and form partnerships with OTT providers to diversify revenue. Additionally, Telkom should implement a knowledge transfer program to retain expertise in TDM based interconnection and enhance skills in IP-based interconnection, ensuring Telkom maintains its competitive edge in Indonesia's telecommunications industry.

**KEYWORDS:** Interconnection Business, OTT (Over The Top), TDM-based Interconnection, IP-based Interconnection, Business Strategy, Regulation

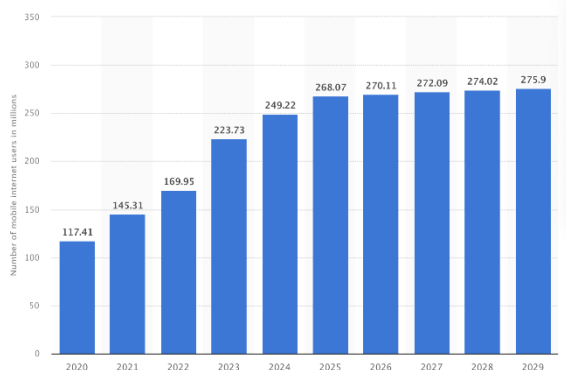
### INTRODUCTION

This template provides all the necessary information to the author regarding the formatting specifications needed for preparing electronic versions of t In the Indonesian telco industry, Telkom Indonesia has long been a dominant player, providing a wide range of services including fixed-line, mobile, internet, and interconnection business (voice and SMS). The interconnection business of Telkom Indonesia plays a crucial role in enabling communication between different network operators such as TELKOMSEL, INDOSAT, XL, H3I, SMARTFREN, facilitating seamless connectivity for their subscribers. By 2022, Telkom Indonesia has led the wholesale traffic market with voice interconnection of 88.6% [1].

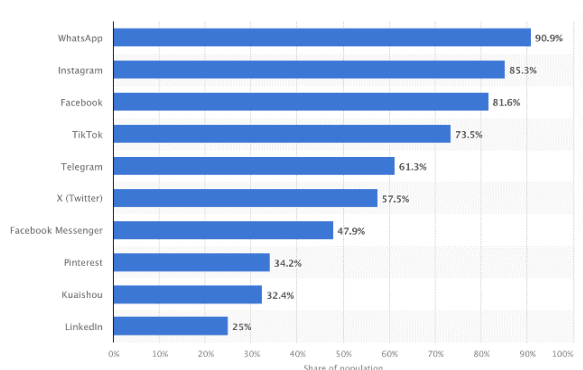
As seen on the figure below, the number of mobile internet users in Indonesia has been increasing from 2020 to estimated 2029 [2]. It is indicated that Indonesian population has significant transformation in recent years, driven by technological advancements and



shifts in consumer behaviour that they rely more on the internet. Based on the Statista, due to the increasing number of mobile internet users in Indonesia, has led to the rapid growth of over-the-top (OTT). As of Q3 2023, with a penetration rate of around 91 percent, WhatsApp is the most used application/platform in Indonesia. However, all the other widely known social media platforms such as Instagram and Facebook also enjoy a high penetration rate, making Indonesia one of the largest social media markets in the world [3]. Among those top 10 social media platforms in Indonesia, three of those applications which is WhatsApp, Telegram, Facebook Messenger, has resulted in a significant shift of voice and SMS messaging traffic from conventional communication platform.



**Fig. 1 Number of Mobile Internet Users in Indonesia 2020-2029**



**Fig. 2 Penetration of leading social networks in Indonesia Q3 2023**

According to the world’s biggest WhatsApp user bases, Indonesia ranked 4th in 2024 with 86,9 million users, a huge increase which has increased from 68,8 million users in 2021 [4]. This growth reflects a significant 18,1% increase over the last three years, demonstrating WhatsApp’s substantial popularity among consumers. The platform offers alternatives modes of communication and content consumption through internet-based platforms. The rise of these platform has changed consumer preferences and behaviour, leading to a decline in traditional voice and messaging services that were once a core revenue stream for Telkom.

Based on the Minister of Telecommunications and Information Technology Regulation Number 8 of 2006 about Interconnection (Peraturan Menteri Telekomunikasi dan Informatika Nomor 8 Tahun 2006 tentang Interkoneksi), Interconnection is the connection between telecommunications networks from different telecommunications network providers. Interconnection must be implemented to provide guarantees for users to be able to access telecommunications services. Interconnection must be provided by telecommunications network operators upon request. In providing guarantees for users to be able to access telecommunications services, telecommunications network operators provide connectivity with infrastructure belonging to telecommunications service provider. As mentioned on the Minister of Telecommunications and Information Technology Regulation Number 8 of 2006 about Interconnection (Peraturan Menteri Telekomunikasi dan Informatika Nomor 8 Tahun 2006 tentang Interkoneksi) and also on the interconnection service offering document owned by Telkom Indonesia, in the interconnection business there are several variables (terms) which are the basic components of implementing the interconnection business [5][17].

**Table 1. List of Term in Interconnection Business**

Variable	Explanation
Access Seeker (Pencari Akses)	Telecommunications Network Operators who request Interconnection services and access to important facilities for interconnection (FPI) at each Point of Interconnection (Point of Interconnection)
Access Provider (Penyedia Akses)	Telecommunications Network Operators that provide Interconnection services and access to essential facilities of interconnection for other Telecommunications Network Operators who submit new request at each Point of Interconnection.
Point of Interconnection (PoI)	The physical location or reference point where the Interconnection occurs, which divided the part of the network that belongs to one Telecommunications Network



Variable	Explanation
	Operator from the part of the network that belongs to another Telecommunications Network Operator in an Interconnection which is the boundary point of authority and responsibility regarding the provision, management and maintenance of the Network Telecommunication
Point of Charge (PoC)	The reference point which is the geographical location for determining the amount of interconnection cost & the responsibility of the interconnection call
Gate Mobile Switching Service Center (GMSC) / Sentral Gerbang	A central in one network which is a gateway to another network, and is directly connected to the central (gate) of another network via an Interconnection Point.
The Interconnection Service Offering Document / Dokumen Penawaran Interkoneksi (DPI)	The Interconnection Service Offering Document is a document that contains the technical, operational and economic aspect of the provisioning of interconnection services offered by Telco Network Operator to other Telco Operator
Signalling Transfer Point (STP)	A point or location which is used for establishing or dissolving interconnection relation between operators by distributing signalling traffic for both interconnection with fixed network and interconnection with cellular mobile network
Interconnection Network	A network used to channel messages or to establish a connection between the origin point and the destination point of interconnection.
Interconnection Links	Link is used for the purposes of distributing Interconnection Traffic that connects central gateways belonging to different Telecommunication Network Operators

The competition in the interconnection business (voice/legacy business) is not limited to competing domestic and international telecommunications operators, it also includes over-the-top (OTT) providers of voice, text, and video-based applications like Whatsapp, Facebook Messenger, Telegram, Line, as described above. As a result, Telkom's revenue from interconnection business—which includes incoming and outgoing voice call services for both domestic and international traffic—has declined [1]. The revenues from Telkom Indonesia's interconnection business continue to decline from the year 2018 to the year 2022. In 2018, Telkom Indonesia's interconnection business revenue was recorded at Rp 4,76 triliun, and in 2022, it was estimated to be Rp 1,91 triliun [6].

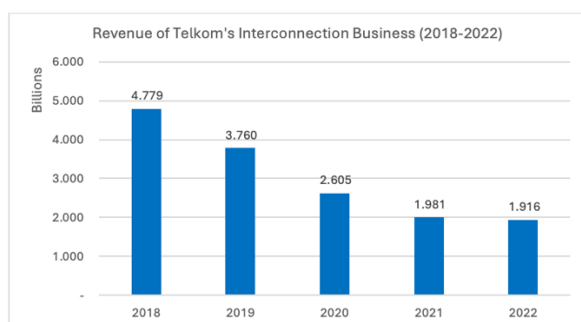


Fig. 3 Revenue of Telkom's Interconnection Business (2018-2022)

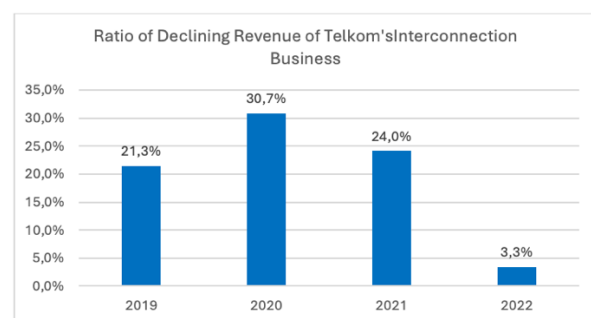


Fig. 4 The Ratio of Declining Revenue of Telkom's Interconnection business

Telkom Indonesia's interconnection business revenue from 2018 to 2022 is shown. It is proven that the decline in revenue from 2018 to 2021 was quite significant. The revenue declining in 2022 was less than the previous years. The highest rate of decline in earnings throughout the 2018–2022 period occurred in 2020, or roughly 30.7%. In 2019, the decline in interconnection business revenue at Telkom Indonesia reached 21.3% when compared to the previous year's revenue. On the other hand, the decline in revenue was 30.7% in 2020, 24.1% in 2021, and 3.3% in 2022. In 2019, the decline in interconnection business revenue at Telkom Indonesia reached



21.3% when compared to the previous year's revenue. Moreover, the decline in revenue was 30.7% in 2020, 24.1% in 2021, and 3.3% in 2022. [1][6]

## LITERATURE REVIEW

### A. *Interconnection Business*

Interconnection business refers to the activities involved in linking different communication networks together, enabling them to exchange data, calls, or messages seamlessly. It's like building bridges between different companies or services so that they can communicate and work together smoothly.

#### 1) *Interconnection Business Overview*

Since the early 1990s, the internet has evolved into a widely-used technology platform, facilitating the creation of value-added services with global connectivity. During this time, there has been a significant increase in both the number of internet users and the volume of data exchanged annually. Recent advancements in access technologies, such as FTTH and LTE, have notably improved connectivity options, allowing users to access the internet from anywhere at any time. Consequently, internet service providers (ISPs) and mobile operators (MOs) have expanded their service offerings to include popular applications like IPTV, video on demand (VoD), free voice calls, and mobile broadband, making their portfolios more appealing to consumers [7]. However, despite these advancements, current internet technologies and business practices related to network interconnection are unable to sustainably support the development of all stakeholders within the value chain, ranging from application developers to network service providers. While over-the-top (OTT) providers are able to generate new revenue streams by developing high-performance applications, network service providers struggle to keep up with the escalating demand for data delivery without the ability to effectively recover the additional costs associated with network infrastructure upgrades. The existing peering agreements are rigid and fail to consider quality of service (QoS) parameters, and network operators primarily rely on revenue generated from flat-rate pricing in access networks [7].

#### 2) *Customer Churn in Telco Business*

In journal titled "Customer churn analysis: Churn determinants and mediation effects of partial defection in the Korean mobile telecommunications service industry" mentioned that several key determinants of customer churn is service quality, pricing structures, customer satisfaction, and the impact of alternative services available in the market. Through an analysis of various stages from customer dissatisfaction to partial defection to total churn, the research highlights early warning signs and possible paths for service providers to take action. For telco businesses, this comprehensive awareness of partial defection is a crucial signal that requires immediate corrective measures in order to avoid losing consumers in the long run. The results indicate that in order to reduce the risks related to customer loss, telco operators must constantly improve the quality of their services, modify their pricing procedures, and improve overall customer satisfaction. In the end, the strategic importance of identifying and resolving early customer disengagement and provides a convincing framework for developing customer retention plans that are more successful in the mobile telecoms sector [8].

#### 3) *Business Challenge in Telco Industry*

According to Cooper's law, advancements in the fundamental concepts of physics and mathematics have accelerated the availability of the mobile communications spectrum. As a result, global organizations such as the International Telecom Union (ITU) and the 3rd Generation Partnership Project (3GPP) have progressively created communication standards that have enabled the introduction of new mobile communications technology generations roughly every decade. Mobile communications now offer a wider range of applications and greater market potential because to these technological advancements. Notably, governments acknowledging the crucial role of mobile communications technology to national information security have actively influenced the direction of technology development and standardization processes, including those from the United States, the European Union, Japan, and South Korea. The different ways in which governments are involved significantly affect the competitive environment of the telecommunication industry sector and the differences in industry performance between countries [9].

### B. *Internal Environment Analysis*

VRIO framework is used to define the competitive advantages and analyze current condition of the company. As stated in journal by Bresser and Powala, VRIO framework presents a methodical approach to evaluating the resources and capabilities of a firm [10]. This framework aligns with the Resource-Based View (RBV) theory and prompts evaluators to address four key questions concerning the firm's resources or capabilities [11]. These questions encompass inquiries regarding Value, Rarity, Imitability, and Organization. The



Value question probes whether a firm's resources and capabilities empower it to effectively respond to environmental challenges or opportunities. Rarity is assessed by examining whether a resource is controlled by a limited number of competing firms. Imitability is explored through determining whether firms lacking a particular resource encounter difficulties or higher costs in acquiring or developing it. Lastly, Organization investigates whether a firm's overarching policies and procedures are structured to facilitate the exploitation of its valuable, rare, and challenging-to-imitate resources [10].

**C. External Environment Analysis**

**1) PESTEL Analysis**

PESTEL analysis is explained in detail and provides a framework for evaluating external macro-environmental elements that could affect a company's strategic decisions. With the use of this analytical tool, which considers the political, economic, social, technological, environmental, and legal aspects of these external factors, businesses may recognize and assess the possibilities and risks that may occur. Companies can improve their strategic planning methods and modify their strategies to successfully negotiate the ever-changing business environment by carefully considering these aspects [12].

**2) Porter's 5 Forces Analysis**

Porter's Five Forces analysis provides a basic framework for evaluating the competitive forces affecting the attraction and profitability of a business. This analytical tool includes five main elements that individually impact the competitive environment within an industry: the threat of new entrants, the bargaining power of suppliers, the bargaining power of buyers, the danger of substitute goods or services, and the level of competitive rivalry. Organizations can have an in-depth understanding of the industry framework, identify possible sources of competitive advantage, and develop innovative strategies to counter challenges and seize opportunities by carefully evaluating these factors [13].

**D. Business Strategic Formulation**

**1) SWOT Analysis**

SWOT analysis is a strategic planning tool that helps businesses evaluate opportunities and threats from the outside as well as their own internal strengths and weaknesses. This comprehensive framework makes it easier to evaluate the company's existing position in the market in a systematic way and helps in identifying areas that could use advancement and potential for growth. Companies can use a SWOT analysis to identify areas of strength to take advantage of opportunities, weaknesses to reduce threats, and strategic initiatives to be developed in line with their overall objectives [14].

**2) TOWS Matrix Analysis**

The TOWS Matrix, represents a strategic planning tool that builds upon the SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis framework. By systematically pairing internal strengths and weaknesses with external opportunities and threats, the TOWS Matrix enables organizations to develop strategic insights and formulate actionable strategies that align with their internal capabilities and external environmental factors. This matrix facilitates a comprehensive examination of the strategic options available to an organization, guiding decision-making processes towards leveraging strengths, mitigating weaknesses, capitalizing on opportunities, and addressing threats in a comprehensive method [15].

**E. Conceptual Framework**

The conceptual framework for this research focuses on several key interrelated elements. This framework's basic core is the disruptive effect caused by over-the-top (OTT) services, which offer a range of communication and content services via the internet and significantly change conventional communication services like fixed line telephones and SMS [7].

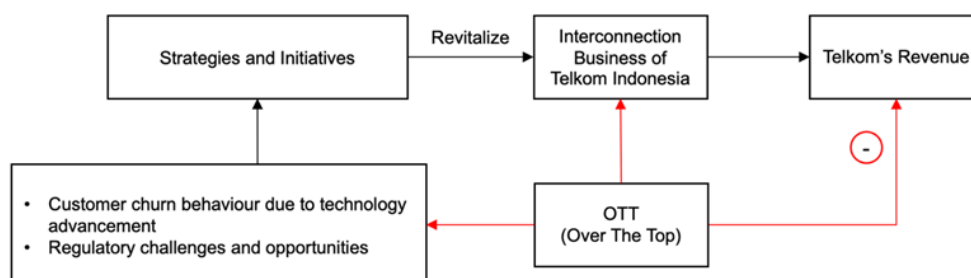


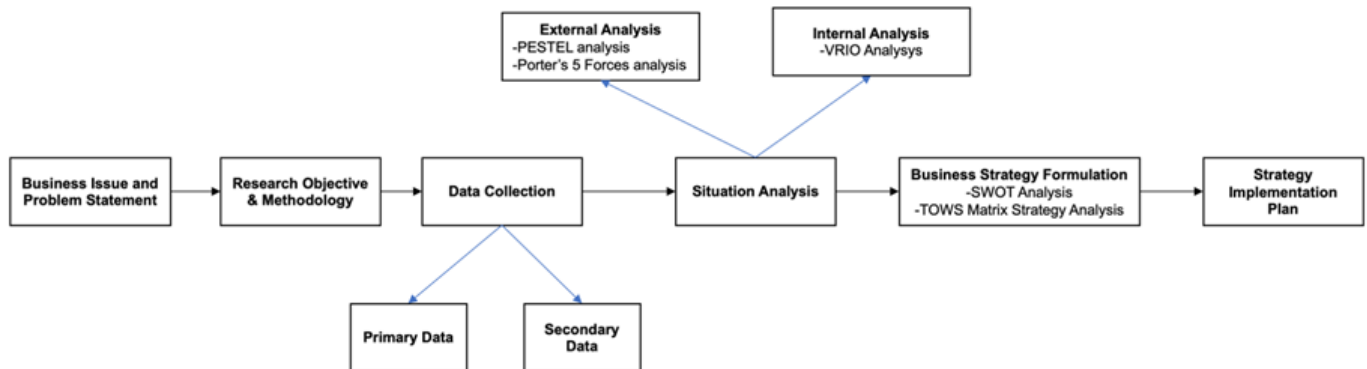
Fig. 5 Conceptual Framework



**METHODOLOGY**

**A. Research Design**

The research design represents a structured approach to analyzing and formulating a business strategy for PT. Telkom Indonesia in an era dominated by Over-The-Top (OTT) services, which have been impacting the declining of interconnection business.



**Fig. 6 Research Design**

**B. Data Collection**

This research collected the data by using interview with Telkom’s stakeholders as a primary data and secondary data is gathered from external sources such as industry reports, academic journals, and benchmark studies that provide context and comparative insights.

**1) Primary Data**

Individual interview was conducted with the respondents from internal Telkom who are related with business strategy for interconnection product. Interview also conducted with the top OLO (Other Licensed Operator) in Indonesia as a customer of the Interconnection product to understand the need, wants and satisfaction of the Interconnection product that Telkom offers. In accordance with the critical data necessary for this final project, the researcher has developed question list for the interviewee align with their roles and domains of expertise.

**2) Secondary Data**

Secondary data utilized for this research are industry reports and analysis from reputable sources such as telecommunications associations, market research firms, and financial institutions. Another secondary data is Telkom Indonesia's annual reports, financial statements, Focus on revenue breakdowns, specifically in the interconnection business segment. Look for trends and patterns over the past several years to identify when the decline began and its magnitude. And, academic journals and research papers related to the impact of OTT services on traditional telecommunications businesses can help to extract relevant findings, theories, and methodologies employed in similar studies. By compiling and analyzing these sources of secondary data, this research can develop a comprehensive understanding of the factors contributing to the declining interconnection business of Telkom Indonesia in the face of OTT pressure in order to propose business strategy in tackle that issue.

**C. Data Analysis Method**

This data analysis method provides a structured approach to understanding the factors contributing to the declining interconnection business of Telkom Indonesia and developing a business strategic response to adapt to the challenges posed by OTT pressure. The combination of revenue, market, regulatory, and customer-centric analyses will enable a holistic and well-informed strategy formulation process. After data collection, the next step is situation analysis which consists of external and internal environment analysis by using several strategic management tools. For external environment analysis, the research will use PESTEL analysis for general environment and Porter Five Forces for industrial environment. The tools for internal environment analysis are Value Chain Analysis. The Value Chain Analysis is a useful analysis tool for defining a firm's core competencies and the activities [11]. The business strategy is formulated by using SWOT Analysis and TOWS Matrix Strategy Analysis. These business strategies will become reference for business model development. The next step is conclusion and recommendation of the research, strategy implementation plan of the generated business model which describe the road map in order to gaining and sustaining competitive advantage of interconnection business by Telkom Indonesia.



**RESULTS**

This section will provide the results of the data analysis based on the gathered primary and secondary data.

**A. Data Analysis**

This section will provide an result of data analysis based on gathered primary data and secondary data.

**1) External Analysis: Porter's Five Forces Analysis**

Here are the result of Porter's Five Forces analysis conducted by researcher

**Table 2. Summary of Competitive Rivalry Analysis**

No	Factor	Analysis	Key Takeaways
1	Technology Transition	<ul style="list-style-type: none"> <li>IP-based technology will soon replace TDM technology in the interconnection business.[16]</li> <li>Competitors will not expand their traditional telecommunications network infrastructure (TDM) for interconnection business purposes.</li> <li>The cellular operator will be more capable of setting up a direct connection between operators and might potentially become an aggressive competitor.</li> <li>There is a possibility of a business scheme change.</li> <li>There is an opportunity for other telecommunications companies to offer transit products by completing licenses of telephone networks and telecommunication services (penyelenggara jaringan dan jasa telekomunikasi).</li> </ul>	<ul style="list-style-type: none"> <li>There is the possibility that competitors whose previously weak positions will become strong</li> <li>There is an opportunity for increasing the number of competitors</li> <li>The competitiveness level rises</li> </ul>
2	Competitor	<ul style="list-style-type: none"> <li>Before the technology transition, Telkom had a very strong position when compared to its competitors.</li> <li>After migrating to IP-based interconnection, Telkom's competitor's position will become stronger due to its wide fiber optic network.</li> <li>The potential of a merger between PT. XL Axiata and PT. Smartfren Telekom, might create a strong competitor in providing local transit services.[18]</li> <li>There is a possibility that this new company could become a long-distance fixed network provider in the future.</li> </ul>	<ul style="list-style-type: none"> <li>Before the technology transition, Telkom had a very strong position and competitor is weaker</li> <li>After the technology transition, Telkom had a very strong position and the competitor also became more powerful.</li> <li>The competitiveness level rises</li> </ul>
3	Market Growth	<ul style="list-style-type: none"> <li>The duration of traffic volume of interconnection products from 2018 to 2022 has decreased every year (12,908.8 million minutes in 2018 to 5,069.9 million minutes in 2022, has decreased as much as 60.72%). [6]</li> <li>In the same period, Telkom Indonesia's interconnection business revenue decreased by 59.9% (4,779 T in 2018 to 1,916 T in 2022).[1][6]</li> <li>In general, the interconnection business market is declining, especially due to the presence of OTT so that the use of interconnection via mobile cellular for communication is decreasing.</li> <li>The declining business of interconnection services tends to be permanent and no longer possible to fight back.</li> </ul>	<ul style="list-style-type: none"> <li>Before the technology transition, Telkom and its competitors focused on strategies to maintain the interconnection business, there would be no significant competition for expansion in the TDM based interconnection business.</li> <li>The competitiveness level is weak</li> </ul>



4	Similarities in the products offered	<ul style="list-style-type: none"> <li>• The interconnection products offered by competitors are the same as the products offered by Telkom, the difference is the range or availability of these products.</li> <li>• Interconnection services are highly dependent on the availability of TDM-based telecommunications network infrastructure</li> <li>• Competitors have TDM-based telecommunications network infrastructure and POIs compared to Telkom.</li> <li>• After the transition to IP based interconnection, with an extensive FO network, the availability of competitors' interconnection services will become increasingly widespread in Indonesia.</li> </ul>	<ul style="list-style-type: none"> <li>• Before the technology transition, competitors' products were the same but availability was limited</li> <li>• After the transition, product availability from competitors became widely available</li> <li>• The competitiveness level rises</li> </ul>
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**Table 3. Summary of Threat of New Entrants Analysis**

No	Factor	Analysis	Key Takeaway
1	Regulation	<p>Due to the transition in technology from Time-Division Multiplexing (TDM)-based interconnection to IP-based interconnection, TDM-based interconnection will no longer be used as an interconnection technology.[16]</p> <p>In order to provide interconnection services, new entrants must have the appropriate licenses (local fixed network operator, long distance direct line fixed network operator, cellular mobile network operator, or satellite mobile network operator).[17]</p> <p>Telco companies with strong Fiber Optic networks can become competitors with the appropriate licenses</p>	<p>It is very unlikely that there will be new entrants in the interconnection business with TDM-based technology</p> <p>Due to technological changes, opportunities will open up for new entrants in the interconnection business in providing transit services.</p>
2	Capital Requirements	<p>Currently, to build telecommunications network infrastructure, a significant amount of capital resources are required.</p> <p>Due to the changes of TDM to IP-based interconnection technology, the need for investment to build telecommunications infrastructure and networks, including fiber optic networks, remains large.</p> <p>Telco companies that already have highly developed fiber optic network infrastructure, the required investment could be reduced significantly.</p>	<p>Before the technology transition, capital requirements were large, after the transition capital requirements decreased for companies with extensive Fiber Optic networks</p>
3	Product Differentiation	<p>There is no product differentiation in the TDM-based interconnection business.</p> <p>In IP-based interconnection, interconnection services can be a form of product differentiation resulting from fiber optic infrastructure used for internet products.</p> <p>Telco companies that already have highly developed fiber optic network infrastructure that is used for internet provision purposes will be able to use that network for interconnection purposes.</p>	<p>There was a small likelihood of new entrants entering the market prior to the technology transition, but after that the potential for new entrants to enter increased</p>





**Table 4. Summary of Bargaining Power of Suppliers Analysis**

No	Factor	Analysis	Key Takeaway
1	Supplier	<ul style="list-style-type: none"> <li>The definition of supplier in the interconnection business is a company that supplies Telkom's telecommunications network technology and equipment.</li> <li>Telkom's telecommunications network technology and equipment is currently provided by Huawei and ZTE which are called as technology enablers.[19]</li> <li>The telecommunications network in the interconnection business is a comprehensive and specific technological entity from the start of the network being built.</li> </ul>	<ul style="list-style-type: none"> <li>Supplier as a technology enabler</li> <li>Engagement with technology enablers is high.</li> </ul>
2	Specialty	<ul style="list-style-type: none"> <li>Interconnection business is a specific business that uses telecommunications networks with special qualifications and requirements.</li> <li>If there is damage to the telecommunications network equipment or components, repair or replacement of the same and specific equipment or components must be carried out from specific technology enabler that have been used</li> </ul>	<ul style="list-style-type: none"> <li>Special technology and equipment</li> <li>Engagement with technology enablers is high.</li> </ul>
3	Cost of Changing Suppliers	<ul style="list-style-type: none"> <li>The telecommunications network in the interconnection business is a comprehensive and specific technological entity from the start of the network being built.</li> <li>The equipment and components used are specific and interrelated in the form of a complex network system so that replacing equipment from different suppliers is not easy and requires high costs.</li> </ul>	<ul style="list-style-type: none"> <li>Special technology and equipment</li> <li>Engagement with technology enablers is high.</li> <li>Cost of changing suppliers is high.</li> </ul>
4	Future integration	<ul style="list-style-type: none"> <li>Integration will be easier if you use technology from the same technology enabler. By using technology from the same technology enabler, the need for adjustments, customization or additional devices will be relatively smaller.</li> </ul>	<ul style="list-style-type: none"> <li>Technology from the same technology enabler is more compatible</li> <li>Engagement with technology enablers is high</li> </ul>
5	Biggest Telco Company	<ul style="list-style-type: none"> <li>Telkom as the biggest telecommunications company in Indonesia</li> <li>Telkom is the main market for technology enablers (suppliers) in the telecommunications sector in Indonesia.</li> </ul>	<ul style="list-style-type: none"> <li>Telkom has strong bargaining power of supplier</li> </ul>



**Table 5. Summary of Bargaining Power of Buyers Analysis**

No	Factor	Analysis	Key Takeaway
1	Number of Customers	<p>The biggest customers of Telkom's interconnection business are the big five cellular operators consisting of Telkomsel, Indosat-Hutchison, XL and Smartfren.[6]</p> <p>This interconnection is an obligation that must be carried out by all operators.[17]</p> <p>Cellular operators interconnect via the Telkom network, which has the most extensive traditional telecommunications network in Indonesia, so the level of customer dependence is high.</p> <p>After the transition to IP-based technology, cellular operators are increasingly able to make direct connections between operators without going through Telkom.</p>	<p>After the transition to IP technology the volume of interconnection traffic may further decrease</p> <p>Customer dependency will be reduced</p>
2	Speciality	<p>There are special requirements to become an interconnection service provider.[17]</p> <p>It requires extensive telecommunications infrastructure and networks.</p> <p>Telkom has a traditional telecommunications network with the widest coverage in Indonesia.</p> <p>After technology transition to IP-based interconnection, Telkom's traditional telecommunications network (TDM), which has the widest coverage with POIs in many locations in Indonesia, is no longer Telkom's specialty.</p> <p>After technology transition to IP-based interconnection, other telecommunications companies and cellular operators will technically have “specialties” that previously only Telkom had.</p>	<p>After the technology transition to IP based interconnection, Telkom's 'specialty' will not be as strong as before the transition so customer dependency will be reduced</p>
3	Switching Cost	<p>Switching a telecommunications network from a transit interconnection service provider to someone other than Telkom requires the construction of a long telecommunications network and requires high investment. Thus switching costs are expensive.</p> <p>After the transition to IP-based technology, the cost of switching will be cheaper because customers have extensive FO (fiber optic) network infrastructure. Direct connections between operators can even be made.</p>	<p>Before the technology transition, the switching cost was expensive. After the transition it will be cheaper and customer dependency will be reduced</p>
4	Price Sensitivity	<p>Interconnection service customers are charged interconnection fees with special business schemes such as revenue cap schemes or volume tiering prices based on B2B negotiations and agreements which are usually valid for one year. In this period price sensitivity has no effect.[5]</p> <p>The interconnection business with TDM-based technology has been running for a long time in a steady decline, service providers are limited, the level of competition is not high, and it is not easy for customers to look for other similar products that are cheaper and then buy them straight away.</p> <p>Due to the technology transition to IP based interconnection, price sensitivity occurs in terms of cost comparisons between direct connections between operators and interconnections via Telkom.[16]</p>	<p>Before the technology transition, price sensitivity was low.</p> <p>After the technology transition cost comparisons between direct connections between operators and interconnections via Telkom and customer dependency will be reduced</p>



5	Product Availability	<p>There are unlimited interconnection products available, but what is limited is the telecommunications network provider, especially the PoI where the interconnection is needed.</p> <p>Due to the transition to interconnection technology, telecommunications companies and cellular operators that have strong FO (fiber optic) network telecommunications infrastructure and have reached most of Indonesia's area will technically be able to provide these transit services. The availability of interconnection service products from the perspective of the service provider will be less limited.[16]</p>	<p>After technology transition, Limitations of interconnection service providers and direct connection capabilities between operators will be reduced significantly and customer dependency will be reduced</p>
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**Table 6. Summary of Threat of Substitute Product Analysis**

No	Factor	Analysis	Conclusion
1	Availability of Replacement Products	<ul style="list-style-type: none"> <li>OTT messaging applications such as WhatsApp (WA), Telegram and others can be accessed easily, just with an internet connection and a smartphone, PC and tablet device.</li> </ul>	<ul style="list-style-type: none"> <li>Replacement products are widely available and easily accessible</li> </ul>
2	Replacement Product Performance	<ul style="list-style-type: none"> <li>OTT messaging applications have more complete functions than telephone and SMS services (video calls, sending data quickly, etc.).</li> <li>The weakness of this OTT messaging application is that it cannot be used in locations or areas where there is no internet connection. However, as time goes by, access to internet availability will become wider so that there will be fewer areas or locations where the internet cannot reach it.</li> </ul>	<ul style="list-style-type: none"> <li>Replacement products have more functions and features</li> </ul>
3	Price of Replacement Products	<ul style="list-style-type: none"> <li>The OTT messaging application can be used as long as there is internet interconnection and does not require a fee to use the applicatin. What costs money is the internet.</li> </ul>	<ul style="list-style-type: none"> <li>Cheap replacement product prices</li> </ul>
4	Customer Willingness to Move	<ul style="list-style-type: none"> <li>OTT messaging applications are getting more and more users every day.</li> <li>WhatsApp is the social media application most used by internet users aged 16-64 years with a population reaching 90.9%</li> <li>WhatsApp users in the world reached 2.45 billion users.[20]</li> </ul>	<ul style="list-style-type: none"> <li>Customers' willingness to switch to using substitute products is very high</li> </ul>

The Porter's Five Forces analysis of PT Telkom Indonesia's interconnection business reveals several strategic challenges and competitive pressures. The transition from TDM to IP-based technology opens opportunities for new entrants, particularly those with strong fiber optic networks, despite the high capital requirements and the need for appropriate licenses creating barriers. The bargaining power of suppliers is significant, with Telkom relying heavily on specific technology enablers like Huawei and ZTE, leading to high costs associated with switching suppliers due to specialized equipment and comprehensive network requirements. The bargaining power of buyers is also significant, as major customers include the top five cellular operators (Telkomsel, Indosat, XL, H3I, Smartfren), creating a dependency on Telkom's extensive traditional telecommunications network. However, this dependency is expected to diminish with the transition to IP-based technology, allowing for direct connections between operators. The threat from substitute products, especially OTT messaging applications like WhatsApp and Telegram, is substantial as they offer enhanced functionalities at lower costs, further intensified by increased internet availability. Industry rivalry is set to increase with the shift to IP-based interconnection, as competitors with wide fiber optic networks gain strength and potential mergers, such as between PT XL Axiata and PT Smartfren Telekom, could further boost competition. These forces highlight the competitive landscape and strategic challenges PT Telkom Indonesia must navigate. The company faces a significant decline in revenue from the interconnection business due to the rapid growth of OTT services, which offer cheaper and more flexible communication options. Additionally, Telkom must



manage the challenges associated with the technology transition from traditional TDM-based to IP-based interconnection services, which further intensifies the competitive pressures and requiring strategic adaptation.

2) **External Analysis: PESTEL Analysis**

Table below shows result of external analysis using PESTEL Analysis as follows

**Table 7. The Key Points of PESTEL Analysis for The Declining Interconnection Business**

No	Forces	Factors	Condition	Opportunities & Threats
1	Political	<ul style="list-style-type: none"> <li>Political Events and Situations</li> <li>Government Programs and Policies</li> <li>International Relations</li> </ul>	<ul style="list-style-type: none"> <li>There is no political fluctuation; policies have not changed drastically;[21]</li> <li>Telecommunications and information technology infrastructure is increasingly expanding to remote areas</li> <li>There are no difficulties in obtaining telecommunications technology, including interconnection.</li> </ul>	<ul style="list-style-type: none"> <li>Increase in mobile subscribers</li> <li>Increase in internet and OTT subscribers</li> </ul>
2	Economy	<ul style="list-style-type: none"> <li>Economic growth</li> <li>Rupiah exchange rate</li> <li>Inflation</li> </ul>	<ul style="list-style-type: none"> <li>Economy grew 5.04% [22]</li> <li>The telecommunications and information industry will continue to grow</li> <li>Investment and maintenance needs will increase as the rupiah exchange rate weakens</li> <li>Price increases in the telecommunications industry are relatively small</li> </ul>	<ul style="list-style-type: none"> <li>Interconnection demand remains</li> <li>Investment and maintenance costs continue to increase</li> </ul>
3	Social	<ul style="list-style-type: none"> <li>Cultural Trends</li> <li>Population and Generations</li> <li>Culture and Generations</li> </ul>	<ul style="list-style-type: none"> <li>The majority of people use OTT messaging applications[23]</li> <li>The population is dominated by Gen Z, Millennials, and Gen X.[24][25]</li> <li>The use of OTT messaging applications has become a culture among the generation with the largest population in Indonesia.</li> </ul>	<ul style="list-style-type: none"> <li>OTT messaging applications are increasingly dominating</li> </ul>
4	Technology	<ul style="list-style-type: none"> <li>OTT Messaging Application</li> <li>TDM Based Interconnection</li> <li>IP Based Interconnection</li> <li>Starlink</li> </ul>	<ul style="list-style-type: none"> <li>Substitute product and increasingly dominate</li> <li>The age of TDM-based interconnection business will be over[16]</li> <li>IP technology requires investment, it is cheaper to maintain</li> <li>Telkom's main advantage will be reduced; the strength of competitors increases; open other business opportunities</li> <li>Users of OTT messaging apps are increasing; decreased interconnection</li> </ul>	<ul style="list-style-type: none"> <li>New investment</li> <li>OPEX efficiency</li> <li>Replacement products available (OTT)</li> <li>Decline in interconnection business</li> <li>Competition increases</li> <li>New revenue streams</li> </ul>
5	Environment	-	-	There is no effect
6	Law	<ul style="list-style-type: none"> <li>Regulations TDM to IP transition</li> </ul>	<ul style="list-style-type: none"> <li>The age of the TDM interconnection business will not be long[16]</li> <li>Telkom's main advantage will be reduced; the strength of competitors increases; open other business opportunities; the chances of new entrants appearing increase</li> </ul>	<ul style="list-style-type: none"> <li>Decline in interconnection business</li> <li>Competitors are strengthening</li> <li>New arrivals appear</li> </ul>



The PESTEL analysis of PT Telkom Indonesia’s interconnection business highlights several external factors that significantly influence its operations and strategy. Politically, the environment is stable, with government programs aimed at expanding telecommunications infrastructure, particularly to remote areas, which supports broader connectivity. Economically, Indonesia’s economy grew by 5.04%, and while the telecommunications industry is expected to continue growing, the sector faces rising investment and maintenance costs due to the weakening Rupiah. Socially, there is a significant shift in consumer behavior, with Gen Z, Millennials, and Gen X predominantly using OTT messaging applications, reducing reliance on traditional communication methods which are telephone and SMS. Technologically, the rise of OTT messaging applications and the mandatory change from regulator about technology transition from TDM-based to IP-based interconnection technology are critical factors. These changes necessitate substantial technological adjustments and investments. Although environmental factors have a limited direct impact, there is a general trend towards sustainable practices and energy-efficient technologies in the industry. Legally, regulations enforcing the shift from TDM to IP-based interconnection drive technological changes and affect the competitive dynamics within the industry. These political, economic, social, technological, environmental, and legal factors shape the strategic considerations for PT Telkom Indonesia. The company must navigate challenges from the rapid growth of OTT services, increased operational costs, and the technological transition to IP-based interconnection. It should also leverage government support and adapt to evolving consumer behaviors to sustain and expand its interconnection business in a competitive market.

3) **Internal Analysis : VRIO**

Here is the summary of internal analysis using VRIO framework conducted by researcher

**Table 8. The Result of VRIO Analysis for The Declining Interconnection Business of Telkom Indonesia**

Internal Capabilities	Value	Rarity	Inimitability	Organized	Competitive Advantage?
Telkom has telco network infrastructure with the widest coverage	Yes	Yes	Yes	Yes	Sustained Competitive Advantages
Telkom has the largest number of Point of Interconnection (PoI) & STP	Yes	Yes	No	Yes	Temporary Competitive Advantage
Telkom’s Ownership of all telecommunications network and service operator licenses	Yes	Yes	No.	Yes	Temporary Competitive Advantage
Telkom has B2B Business Model Agreement with all licensed Telco operator	Yes	Yes	No	Yes	Temporary Competitive Advantage
Telkom has the major base of consumers in Indonesia	Yes	Yes	No.	Yes	Temporary Competitive Advantage
Telkom has business and technical expertise, including technology of TDM and IP-based interconnection	Yes	Yes	No	Yes	Temporary Competitive Advantage
Telkom owns Telkomsel as a subsidiary	Yes	Yes	Yes	Yes	Sustained Competitive Advantages

**B. Business Strategic Formulation**

This section will provide an analysis based on evaluation of both internal and external factors and highlighting determining factors that in order to get comprehensive analysis.

1) **SWOT Analysis**

**STRENGTHS**

[S1] The wide telecommunication network infrastructure and the large number of Points of Interconnection (PoI) spread throughout Indonesia are the key drivers of PT Telkom Indonesia's dominance in the interconnection business. Telkom is able to offer dependable and widely available connectivity services because of its broad coverage. Telkom's competitive edge is further enhanced by the difficulties for rival businesses to duplicate its extensive infrastructure and PoI coverage.





[S2] PT Telkom Indonesia's comprehensive ownership of all necessary licenses to enable Telkom to offer a full range of interconnection products such as origination, transit, and termination services.

[S3] PT Telkom Indonesia's strength in the interconnection business comes from its strong business agreements with all major telecom operators in Indonesia.

[S4] PT Telkom Indonesia's strength in the interconnection business comes from its large and diverse customer base. The extensive customer base enhances Telkom's ability to provide comprehensive interconnection services, reinforcing its leading position and competitive edge in the telco industry.

[S5] PT Telkom Indonesia's strength in the interconnection business is its business and technical expertise in both TDM and IP-based interconnection technologies.

[S6] PT Telkom Indonesia's financial reports highlight its strong capital investment as a key strength of the company that show significant resources dedicated to modernizing infrastructure and expanding services.

## **WEAKNESSES**

[W1] Despite having a dedicated digital unit called Digital Business & Technology (DBT) which is mentioned on the company profile, PT Telkom Indonesia has struggled to create competitive over-the-top (OTT) products

[W2] PT Telkom Indonesia faces a significant weakness with its expensive product pricing compared with the other licensed operator and over-the-top (OTT) services.

[W3] Based on the interview with delivery traffic team, it was revealed that the operation of the TDM based interconnection relies heavily on collaboration with the service operation team, which comprises older employees who are soon to retire. This creates a significant issue, as there is lack of regeneration to fill these critical roles. The expertise of these employee is urgently needed to maintain the existing TDM based interconnection and to manage the transition technology phase from TDM to IP-based interconnection.

## **OPPORTUNITIES**

[O1] As the industry transitions from TDM-based to IP-based interconnection technologies due to regulation in 2025, Telkom has the opportunity to invest in and expand its IP-based service offerings.

[O2] Transitioning TDM-based to IP-based interconnection networks can result in lower operating and maintenance costs since Telkom already has extensive IP network infrastructure in the data sector (internet).

[O3] As more people in remote areas gain access to cellular services, there is a growing market for interconnection products. Telkom can capitalize on this by expanding its coverage and enhancing its services in these areas whether TDM or IP based interconnection.

[O4] The demand for interconnection services is expected to remain, providing Telkom with continuous revenue opportunities. Competitors might attempt to enter this industry, but Telkom's existing infrastructure, customer base, and comprehensive service offerings place it in a strong position to meet this demand efficiently.

[O5] The shift from TDM-based to IP-based interconnection and the development of new interconnection business schemes can open up new revenue streams for Telkom. Innovative interconnection models and services can attract new customers and provide additional revenue sources

## **THREATS**

[T1] Competitors are becoming stronger and more capable of matching Telkom's services, especially with the transition from TDM-based to IP-based interconnection. The availability of similar products from competitors can erode Telkom's market share.

[T2] Regulator may introduce new rules that affect how IP-based interconnections are managed and priced. Competitors who adapt more swiftly to regulatory changes could gain a market advantage.

[T3] As the industry moves towards IP-based interconnections, Telkom must ensure its technology remains cutting-edge. Competitors who quickly adopt new technologies can offer more efficient and cost-effective services.

[T4] The availability of substitute products, such as OTT (over-the-top) services like WhatsApp, Skype, and others, presents a significant threat that causes a reduction of Telkom's revenue. These services offer similar or enhanced functionalities at lower costs, leading to a potential decline in demand for traditional interconnection services provided by Telkom.



[T5] Economic fluctuations, such as changes in exchange rates, inflation, or economic downturns, can impact Telkom's costs and revenue. These economic factors can affect investment capacity, operational costs, and overall profitability, posing risks to Telkom's financial stability.

2) **TOWS Analysis**

As seen on the table below, there are 4 quadrants of TOWS matrix that consist of combination Strength - Opportunity (SO) which leverages strengths to capitalize on opportunities, Weakness - Opportunity (WO) which addresses weaknesses by exploiting opportunities, Strength - Threat (ST) means that uses strengths to mitigate threats, and Weakness - Threat (WT) which minimizes weaknesses to defend against threats.

**Table 9. TOWS Matrix Analysis**

<b>EXTERNAL ANALYSIS</b>	<b>INTERNAL STRENGTHS ANALYSIS</b>	<b>WEAKNESSES</b>
<p><b>OPPORTUNITIES</b></p> <p>O1 : Expansion of IP-Based Services:</p> <p>O2 : Efficient Operating and Maintenance Costs of IP-Based Interconnection Networks</p> <p>O3 : Increase in Cellular Subscribers in Remote Areas</p> <p>O4 : Demand for Interconnection Products</p> <p>O5 : New Revenue Stream Opportunities from New Interconnection Schemes</p>	<p>S1 : Telkom Indonesia's Extensive Telco Network Infrastructure and Largest Number of Points of Interconnection (PoI) in Indonesia</p> <p>S2 : Telkom's Ownership of All Telecommunications Network and Service Operator Licenses</p> <p>S3 : Comprehensive B2B Agreements and Strategic Ownership of Telkomsel</p> <p>S4: Large Customer Base</p> <p>S5 : Own its business and technical expertise in both TDM and IP-based interconnection technologies.</p> <p>S6 : Telkom has strong capital investment</p> <p>S1.S2.S3.S6.O1.O5 Utilize Telkom's extensive network infrastructure, licensed owns, comprehensive B2B agreements, strong capital investment to roll out and expand IP-based interconnection services across and capturing new revenue streams through innovative interconnection schemes. (SO1)</p> <p>S4.S5.O2.O4 Apply Telkom's technical and business expertise to optimize operational and maintenance costs while leveraging the large customer base to pilot new interconnection services in order to fulfill the demand for interconnection products effectively. (SO2)</p>	<p>W1 : Telkom's digital division has not yet developed communication platform similar to OTT products</p> <p>W2 : Product Price is Expensive</p> <p>W3 : Relies on soon-to-retire employees</p> <p>W1.O1.O5 Develop and launch competitive OTT services leveraging the expansion of IP-based interconnection such as RCS (Rich Communication Services). Focus on unique features and integrations that appeal to both individual and business segments. (WO1)</p> <p>W2.O2.O4 To address the weakness of expensive product pricing, utilize the cost savings from its efficient IP-based network operations could help Telkom to adjust product pricing, making its services more competitive to attracting new customers and retaining existing ones (WO2)</p> <p>W2.O2.O3 Implement cost-efficient technologies to reduce operating expenses and enable more competitive pricing so Telkom can adjust its pricing strategies especially targeting high-growth remote areas such as IKN (WO3)</p>



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<b>THREATS</b>		
T1 : Competitors are becoming stronger and more than capable of matching Telkom's services, especially with the transition from TDM-based to IP-based interconnection	S1.S4.T1.T4 Develop services that combine traditional interconnection with OTT functionalities such as offering bundled packages data and voices to retain large customers and also invest in continuous R&D in IP-based interconnection to stay ahead of competitors. (ST1)	W3.T1. Develop a comprehensive knowledge transfer program from senior expertise to junior expertise to ensure that critical expertise is retained within the organization. (WT1)
T2 : Regulator may introduce new rules that affect how IP-based interconnections are managed and priced	S3.T2.T5 Leverage Telkomsel's market influence and existing B2B agreements to actively engage with government regulators to generate policies that favor the adoption and pricing of IP-based interconnections which proposing Telkom to be "IP Hubber" so positioned as transit provider could be maintain (ST2)	W3.T3 Focus on training certain employees to handle new technologies specifically about IP-based interconnection to enrich critical knowledge and skills within the company while expanding the services (WT2)
T3 : As the industry moves towards IP-based interconnections, competitors who quickly adopt new technologies can offer more efficient and cost-effective services.	S3.T4 Integrate OTT services into its offerings through partnerships with OTT providers to diversify revenue streams and capture a portion of the expanding OTT market. (ST3)	
T4 : The availability of substitute products, such as OTT services that disrupt interconnection business, Starlink		
T5 : Economic fluctuations can impact Telkom's costs and revenue.		

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The TOWS matrix analysis for PT Telkom Indonesia has been completed, resulting in the development of 10 strategic initiatives aimed at facing the decline in the interconnection business. These strategies include leveraging Telkom's extensive network and B2B agreements to expand IP-based services, optimizing operational costs, and developing integrated service offerings. Additionally, engaging with government regulators to promote favorable policies and diversifying service offerings are key components of the plan. Other strategies focus on integrating OTT services through partnerships, launching competitive OTT services like Rich Communication Services (RCS), and adjusting product pricing using cost savings from efficient IP-based operations. Implementing cost-efficient technologies, ensuring knowledge transfer within the organization, and training employees in new IP-based technologies are also crucial. By consolidating those 10 strategies as mentioned on TOWS matrix result, researchers generate five key initiatives which will be breakdown into specific activities in the implementation plan. These five key initiatives are explained below.

- 1. Expansion and Optimization of IP-Based Interconnection Services:** Telkom Indonesia should leverage its extensive network infrastructure, licensed assets, and comprehensive B2B agreements to aggressively roll out and expand IP-based interconnection services. By utilizing its strong capital investments and technical expertise, Telkom can optimize operational and maintenance costs, ensuring efficient service delivery. This strategy includes piloting new IP-based interconnection services within its large customer base in cities like Jakarta, Surabaya, Medan, and Makassar to capture revenue streams for the new IP-based interconnection services.
- 2. Regulatory and Market Engagement:** Telkom's market influence and existing B2B agreements with all licensed operators should be leveraged to actively engage with government regulators, advocating for policies that favor the adoption and competitive pricing of IP-based interconnections. These regulatory engagements can also be used to diversify Telkom's service offerings and mitigate economic risks. By fostering supportive relationships with regulators, Telkom could propose



to be an “IP Hubber,” ensuring sustained market presence and profitability, especially in transit products as the biggest revenue generator among other interconnection products.

3. **Competitive Pricing and Cost Efficiency:** Telkom should utilize cost savings from its efficient IP-based network operations to adjust product pricing, making its services more competitive. By optimizing the operations of its existing 13 Signaling Transfer Points (STPs), Telkom can reduce operating expenses and adopt more aggressive pricing strategies. For example, consolidating STPs in Java Island from five to four, by eliminating the STP in Bandung, can increase density while maintaining service quality. Similar consolidation can be applied to other regions like Sulawesi. These cost-efficient initiatives will enable Telkom to sustain and expand its market presence in both urban and remote regions.
4. **R&D and Product Differentiation:** Continuous investment in R&D is crucial for Telkom to stay ahead of competitors in the IP-based interconnection market. By offering bundled packages of data and voice services to interconnection product customers, Telkom can retain large customers and differentiate itself in the market. Partnerships with OTT providers will diversify Telkom’s revenue streams. Launching competitive OTT services, such as RCS, will further strengthen Telkom’s market position. This strategy emphasizes the importance of innovation and differentiation in maintaining a competitive edge.
5. **Knowledge Transfer and Employee Training:** To ensure the retention of critical expertise within the organization, Telkom should develop a comprehensive knowledge transfer program. This initiative will facilitate the transfer of knowledge from senior experts to junior staff, maintaining a high level of technical and business acumen. Additionally, targeted training programs for employees on new technologies, specifically IP-based interconnections, will enhance the company’s skills and knowledge base. This focus on continuous learning and development will support the expansion of interconnection service offerings.

**C. Proposed Implementation Plan**

Corresponding with the five initiatives that have been generated from the business strategic formulation section using TOWS Matrix and the SWOT analysis before, researcher propose the implementation plan for Telkom Indonesia in facing the challenges of declining interconnection business:

Objectives	Actions	Responsible Unit	Timeline													
			2024						2025							
			Jun	Jul	Agu	Sept	Okt	Nov	Des	Jan	Feb	Mar	Apr	Mei	Jun	
<b>Key Initiatives 3: Competitive Pricing and Cost Efficiency</b>																
1. Adjust product pricing to make services more competitive	Utilize cost savings from efficient IP-based network operations	Finance, Business Planning, Delivery and Assurance & Network Operations														
2. Implement cost-saving measures in network operations	Analyze current operational costs and identify areas for savings	Finance, Business Planning, Performance, Delivery and Assurance & Network Operations														
3. Offer attractive and flexible pricing options to customers	Reinvest savings into competitive pricing strategies such as Offer tiered pricing based on usage and service levels	Marketing & Sales														
4. Increase awareness and adoption of tiered pricing packages	Launch promotional campaigns to highlight new pricing structures	Marketing														
5. Maintain service quality while reducing costs but ensure seamless transition without service disruptions	Compact the SBCs for efficient operations while completing technology transition the TDM to IP based interconnection services	Network Operations														
6. Develop targeted expansion plans for new regions	Conduct market research to identify high-growth remote areas	Business Development														
7. Expand market presence in urban and remote regions	Target high-growth remote areas like IKN or any other area to enlarge the Pols coverage	Business Development														
<b>Key Initiatives 4: R&amp;D and Product Differentiation</b>																
1. Invest in continuous R&D	Allocate budget for R&D in emerging technologies especially in diversification product of IP based interconnection services	Finance, R&D Department														
2. Ensure continuous innovation and product development	Conduct continuous innovation and product improvement and prepare the roadmap implementation	R&D Department, Product Development														
3. Provide value-added services to customers	Develop integrated service offerings combining data and voice services in IP-based network	Product Development														
4. Increase customer awareness and adoption of bundled services	Conduct targeted marketing campaigns to promote bundled packages	Marketing														
5. Develop innovative solutions that meet the market demands	Conduct market research to identify customer needs beyond those of operators, such as OTT provider	Marketing & Business Development														
6. Enhance service offerings and market reach	Identify and collaborate with leading OTT providers such as develop co-branded service offerings with OTT providers	Marketing & Business Development														
<b>Key Initiatives 5: Knowledge Transfer and Employee Training</b>																
1. Ensure critical expertise is documented and shared	Identify key senior experts and critical knowledge areas especially for the operation of interconnection services both TDM and IP based	HR & Training														
2. Provide direct mentorship and ensure the program meets the business needs	Create structured mentorship programs pairing senior experts with junior staff	HR & Training														
3. Equip employees with necessary skills and knowledge	Develop training curriculum focused on IP-based interconnections	HR & Training														
4. Ensure up-to-date, easy to access and relevant training content	Partner with technology enabler for specialized training sessions with interactive e-learning content	HR & Training														
5. Continuously improve training quality and relevance in order to maintain high standards of training excellence	Collect and analyze feedback from training participants	HR & Training														



Objectives	Actions	Responsible Unit	Timeline													
			2024						2025							
			Jun	Jul	Agu	Sept	Okt	Nov	Des	Jan	Feb	Mar	Apr	Mei	Jun	
<b>Key Initiatives 1: Expansion and Optimization of IP-Based Interconnection Services</b>																
1. Utilize capital investments and technical expertise	Conduct a detailed assessment of existing network infrastructure to identify	Finance, Business Planning, Performance,														
2. Optimize operational and maintenance costs	Develop detailed budget and investment plan for IP-based service expansion and compacting the SBC	Finance, Business Planning, Delivery and Assurance & Network Operations														
3. Ensure smooth transition and integration of new services	Piloting roll out new IP-based services in 3 high generated traffic which is Jakarta, Medan, Surabaya and also with pilot customer	Business Delivery and Assurance & Network Operations														
4. Use feedback to refine and improve services	Set up regular feedback sessions with pilot customers	Marketing & Sales														
5. Increase customer adoption and market penetration	Conduct targeted marketing campaigns to promote new IP-based interconnection services	Marketing														
6. Increase awareness and interest in IP-based interconnection services	Develop marketing materials and campaigns specific to promote new IP-based interconnection services	Marketing														
7. Enhance service quality and customer satisfaction	Collaborate with existing customers to gather feedback and improve service offerings	Marketing & Sales														
8. Leverage extensive network infrastructure and licensed assets	Roll out IP-based interconnection services in technology transition period	Business Performance, Delivery and														
<b>Key Initiatives 2: Regulatory and Market Engagement</b>																
1. Establish a presence in regulatory discussions in order to Strengthen relationships with regulators	Schedule regular meetings with key government regulator (e.g., Ministry of Communication and Information Technology) to discuss regulatory updates and propose policy changes in era of transition TDM to IP based technology	Regulatory Affairs														
2. Influence policy decisions in favor of Telkom's business	Develop and submit comprehensive policy proposals for transition to IP-based interconnection services	Regulatory Affairs														
3. Establish Telkom as a central node for IP-based interconnections	Propose Telkom as the "IP Hubber"	Business Development														
4. Ensure proposals about initiatives on Telkom to be "IP Hubber" in IP-	Research global best practices and tailor proposals to local context of IP based	Regulatory Affairs														
5. Secure regulatory and market support for the IP Hubber role	Collaborate with industry experts and consultant to develop a detailed proposal highlighting the benefits of Telkom as the IP Hubber and Ensure alignment with industry standards and regulations	Business Development & Regulatory Affairs														
6. Propose Telkom as the "IP Hubber" to sustain market presence and	Initiate joint initiatives and collaborations with all licensed operator in order to	Business Development														
7. Increase awareness and approval from industry stakeholders	Conduct targeted campaigns to communicate the advantages of Telkom as the IP	Marketing														

Fig. 7 Proposed Implementation Plan

DISCUSSION

Based on the findings of this study, PT Telkom Indonesia is experiencing a significant decline in its interconnection business revenue, which fell from Rp 4.76 trillion in 2018 to Rp 1.91 trillion in 2022. This decline is largely due to the growing consumer preference for Over-The-Top (OTT) services like WhatsApp and Telegram, which have replaced traditional voice and messaging services. The transition from Time-Division Multiplexing (TDM) to Internet Protocol (IP)-based interconnection technology, required by government regulations, marks a crucial phase for all telco providers including Telkom. To navigate these challenges, Telkom should prioritize the expansion of its fiber optic network to ensure robust support for IP-based interconnection and maintain competitiveness during this technological transition era for interconnection business in Indonesia.

One of the initiatives generated from this research is for Telkom to position itself as an IP hubber. This would allow Telkom to centralize and manage a large volume of IP traffic, both domestic and international, thereby becoming a pivotal player in the region's telecommunications infrastructure. This role would enhance its revenue streams through interconnection fees and position Telkom as a strategic partner for all telco operators, global OTT providers, and international carriers seeking efficient and reliable IP-based interconnection services. Additionally, Telkom must explore new revenue streams such as digital services and platforms, leveraging its existing infrastructure to offer value-added services that align with market demand. These could include cloud services, data centers, cybersecurity solutions, and IoT services, all of which are rapidly growing areas in the digital era. Furthermore, as an IP hubber, Telkom would have the opportunity to influence industry standards and regulatory policies, promoting a regulatory environment that supports growth and innovation in IP-based interconnection. By focusing on these strategies and leveraging its strengths, PT Telkom Indonesia can adapt to the evolving market dynamics and position itself as a leader in the upcoming IP-based interconnection era, addressing the immediate challenges of declining traditional interconnection revenues and setting the stage for long-term growth and sustainability they of the interconnection business.





## CONCLUSION

As mentioned in the previous sections, the interconnection business at PT Telkom Indonesia experiencing decline in revenue over the years due to rapid growth of OTT services, it is proved by its revenue decline from 2018-2022 marking a 59,9% decline over five years, another fact to add was a highest annual decline in 2020 with a 30,7% drop and keep declining in the next years. WhatsApp users in Indonesia increased from 68.8 million in 2021 to 86.9 million in 2024, reflecting an 18.1% growth over three years, indicating rapid growth of OTT services in Indonesia.[1][6]

The technology transition from Time-Division Multiplexing (TDM) to IP-based interconnection technology presents significant challenges for Telkom Indonesia due to regulatory changes which mentioned on the Minister of Telecommunications and Information Technology Regulation Number 5 of 2021 concerning Telecommunications Operations (Peraturan Menteri Telekomunikasi dan Informatika Nomor 5 Tahun 2021 tentang Penyelenggaraan Telekomunikasi) [16]. Nevertheless, Telkom faces intense competition from other telecommunications operators about the probability of competitor mergers to match Telkom's capabilities in the context of licenses and extensive networks which are well-positioned to offer direct connections between operators, potentially bypassing Telkom's network when IP based interconnection will be implemented. Such mergers could enable competitors to provide comprehensive transit services, further intensifying the competition. Additionally, the rise of free OTT messaging apps continues to reduce the demand for traditional interconnection services which are telephone and SMS. To face the declining interconnection business, Telkom Indonesia could focus on these five key initiatives as a business strategy generated from this research, a. Expansion and Optimization of IP-Based Interconnection Services, b. Regulatory and Market Engagement by proposing Telkom as IP Hubber, C. Competitive Pricing and Cost Efficiency, D. R&D and Product Differentiation, and E. Knowledge Transfer and Employee Training.

Some recommendations for Telkom Indonesia to facing the challenges in interconnection business are enhancing customer experience and digital transformations, focus on leveraging the digital products and services, and perform strategic investments in emerging technologies. This research also recommends to conduct a deeper analysis in Impact of IP-based Interconnection services, customer behavior and satisfaction that become one of determining factor in telco industries, and analyzing competitive landscape and market trends especially in the IP-based interconnection and OTT Market.

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