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Analysis and Visualization of Tracer Study Data Through Kimball Four-Step Method and Tableau

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Abstract: Tracer studies serve as a pivotal survey mechanism to assess the efficacy of educational systems and the compatibility of graduates with labor market requirements. This research leverages Big Data technologies alongside Tableau to scrutinize tracer study data gathered from alumni of Politeknik Caltex Riau (PCR) over the period from 2018 to 2022. Employing the Four-Step Kimball methodology, the study regularly undertakes data collection, processing, validation, and storage within a MongoDB database, prior to generating visual representations through Tableau. The analytical framework incorporates descriptive statistics, correlation analysis, and regression models to examine critical variables, including the alignment between academic disciplines and occupational roles, as well as the spatial distribution of graduates across regions. The visualizations produced facilitate data-driven decision-making, enabling enhancements in curriculum design, the advancement of career support services for alumni, and the fortification of ties with industrial stakeholders. Key results reveal a significant positive relationship between graduates' Grade Point Average (GPA) and their income levels, alongside a consistent year-on-year rise in participation rates for tracer studies, with the rate reaching 99.06% by 2022. Furthermore, the findings underscore notable trends in employment sectors and geographic mobility, with 74.58% of alumni employed within Indonesia, predominantly in Riau Province. These outcomes affirm the robustness of the implemented data analysis framework in bolstering policy formulation for educational institutions. Beyond immediate implications, the study highlights the potential of integrating scalable data management systems with advanced visualization tools to address the evolving challenges of alumni tracking and institutional accountability in higher education.

Keywords: Tracer Study; Big Data; Tableau; Four-Step Kimball Methodology; MongoDB; Data Analysis; Data Visualization.

1. Introduction

In the rapidly evolving landscape of higher education, tracer studies have emerged as a critical instrument for assessing the impact of academic programs on graduates' career trajectories and their alignment with labor market demands. These studies provide essential feedback for institutions to evaluate the relevance of their curricula, the employability of their alumni, and the overall effectiveness of their educational offerings. Prior research has explored various dimensions of tracer studies, including their role in mapping alumni outcomes, as highlighted by Sitorus *et al.* (2023), who emphasized the importance of systematic data collection for understanding career progression [1]. Similarly, Susanti and Wibawa (2021) investigated the integration of technology in tracer study analysis to enhance the accuracy of profiling graduates from specific programs [2]. Additionally, Sari and Yorasaki (2022) examined the application of Business Intelligence tools in monitoring alumni, underscoring the potential of data-driven approaches in institutional planning [3]. Despite these advancements, a significant gap persists in the comprehensive adoption of Big Data technologies and advanced data visualization techniques within the tracer study framework. Many existing studies rely on traditional methodologies that struggle to handle the scale and complexity of modern datasets, often resulting in fragmented insights that fail to fully inform strategic decision-making. This research seeks to address this deficiency by integrating Big Data solutions with interactive visualization platforms, specifically through the application of the Four-Step Kimball methodology—a structured approach to data warehousing that ensures scalability and analytical precision. The primary objective is to transform raw tracer study data into actionable intelligence that can guide curriculum development, enhance alumni career support services, and strengthen partnerships with industry stakeholders.

At Politeknik Caltex Riau (PCR), where this study is conducted, the challenges of managing large data volumes, addressing inconsistencies in data quality, and navigating the analytical complexity required to derive meaningful conclusions are particularly pronounced. To tackle these issues, this research employs the Four-Step Kimball Method, which comprises several interconnected stages: first, the identification of business needs, which involves defining the core objectives of the tracer study, such as mapping alumni career paths and evaluating curriculum-industry alignment; second, the definition of facts and dimensions, where key metrics like tracer study participation rates, geographic distribution of graduates, educational relevance to employment, and income distribution are analyzed alongside dimensions such as alumni demographics, job locations, industry sectors, and academic qualifications; third, the design of a dimensional model, utilizing a star schema to optimize query performance and data retrieval efficiency; and fourth, the development and population of a data warehouse, wherein data is meticulously cleaned using Python tools like NLTK for text processing and Pandas for structured data manipulation, validated for accuracy, and subsequently stored in MongoDB, a NoSQL database chosen for its ability to manage large, semi-structured datasets with flexibility. The final step integrates Tableau, a powerful visualization tool, to present the analyzed data through interactive dashboards that facilitate intuitive interpretation by institutional leaders and policymakers. Beyond methodological innovation, this study focuses on a comprehensive analysis of tracer study data from PCR alumni spanning the years 2018 to 2022, aiming to uncover trends in employment patterns, income disparities, geographical mobility, and the alignment of educational programs with workforce requirements.

The insights derived are anticipated to empower PCR to refine its academic offerings, ensuring they remain responsive to industry needs, while also bolstering career support mechanisms for graduates through targeted interventions. Furthermore, by demonstrating the transformative potential of combining Big Data architectures with sophisticated visualization tools, this research contributes to a broader discourse on how educational institutions can harness technological advancements to elevate their strategic planning and accountability. The integration of MongoDB for efficient data storage and retrieval, paired with Tableau's capacity to render complex datasets into accessible visual formats, exemplifies a forward-thinking approach to alumni tracking—one that could serve as a model for other institutions grappling with similar data management challenges. While the immediate focus remains on PCR, the methodologies and frameworks proposed herein hold broader implications for higher education systems seeking to navigate the intersection of technology and institutional performance. The subsequent sections of this paper delineate the detailed methodologies employed, the specific data processing and analytical techniques applied, the results obtained, and their implications for enhancing both institutional efficacy and relevance to industry demands. Through this endeavor, the study not only addresses a critical gap in tracer study analysis but also sets a precedent for leveraging cutting-edge tools to inform educational policy in an increasingly data-driven world.

2. Related Work

Alumni tracer studies have long been a valuable tool for evaluating the success of higher education programs. They provide insight into graduates' job opportunities, career progression, and the extent to which

academic curricula meet industry needs. Early research by Sukardi (2015) confirmed the strategic role of such studies in mapping education graduates' career paths, while also showing that such data are crucial for assessing institutional impact [3]. Damayanti (2018) complemented these findings by analyzing vocational education graduates working in fields outside education, revealing a mismatch between academic training and the demands of the jobs they are pursuing, calling for the need to adapt the curriculum to market realities [10]. In line with this, Taufiq, Dewi, and Khusniati (2018) designed an integrated network-based tracer system to document science education graduates' profiles, proving that digital tools can improve the efficiency of data collection and access [5]. Trimurtini, Muslikah, and Wahzudik (2019) added perspective by emphasizing graduates' quality through tracer studies, highlighting indicators such as employment rates and skill relevance as key benchmarks for institutional improvement [6]. While these works emphasize the importance of traceability studies in higher education evaluation, they often fail to include sophisticated analytical frameworks capable of handling large-scale data or producing visual representations that can be directly utilized for decision-making.

Recent trends in research on tracer studies show a shift towards leveraging technology to expand their reach and effectiveness. Sitorus *et al.* (2023) examined alumni mapping from computer science programs, emphasizing the importance of structured data collection to understand career patterns [11]. Susanti and Wibawa (2021) also examined the profile of informatics program graduates, arguing for the use of technology to increase the accuracy and depth of the data collected [12]. Wasito and Birowo (2022) continued the discussion by tracing the employment sector of information systems and information technology graduates over a five-year period, identifying trends that could inform program evaluation [4]. Yorasaki and Sari (2022) added perspective by evaluating alumni and employer views through tracer studies, showing how such an approach can bridge the gap between institutional expectations and industry needs [8]. Sari and Yorasaki (2022) extended the argument by proposing the application of Business Intelligence (BI) tools to build alumni monitoring dashboards, enabling the transformation of raw data into strategic decisions [9][13]. Nugroho and Arifudin (2024) took innovation further by designing a digital mapping application for a research study at a state university, utilizing geographical data to track alumni distribution [14]. Nugraha (2024) proposed an executive information system based on data warehouse techniques to manage research study information, focusing on the system's ability to handle ever-increasing datasets [15]. Aritonang, Wijoyo, and Purnomo (2025) extended even further by designing a BI dashboard for research study monitoring at a computer science faculty, demonstrating the potential of interactive tools to support direct decision-making [16]. However, while these works reflect advances in technology utilization, the majority have yet to fully adopt Big Data architectures or cutting-edge visualization platforms to handle modern datasets. These shortcomings become increasingly apparent as the volume and variety of data to be processed increases.

Outside the realm of traceability studies, the literature on data management and analytics provides a solid theoretical foundation for current research. Chaudhuri and Dayal (1997) provide an early overview of data warehousing and Online Analytical Processing (OLAP) technologies, which are still relevant to constructing large-scale data analyses in educational settings [17]. Kimball and Ross (2013) update this approach through their work on dimensional modeling. They formulate Kimball's Four Steps methodology as a prescriptive framework for data warehouse design, which is central to current research [20]. In the Big Data realm, Muntean and Surugiu (2020) discuss the role of NoSQL databases such as MongoDB in managing semi-structured data, which is particularly relevant for accommodating diverse traceability study datasets [18]. Garcia-Murillo and Annabi (2002) offer a parallel perspective through their analysis of customer knowledge management, which is similar to alumni data management, emphasizing the need for readily applicable insights from stakeholder data [19]. These works collectively form a strong theoretical foundation for integrating state-of-the-art data management methods into traceability study analyses. However, the application of such approaches in higher education environments, especially when combining Big Data with visualization tools such as Tableau, remains largely under-explored. This gap indicates a lack of attention to solutions that bridge complex data analysis with institutions' practical needs.

Another relevant, though not directly related, perspective is educators' role in shaping graduate outcomes. Wahab (2022) emphasizes the importance of teachers on character formation, which indirectly influences alumni's work readiness and success [7]. While interesting, this perspective does not touch on the technical or analytical aspects of traceability studies. This highlights the gap that current research attempts to address. While much work has been published on traceability studies and data management, there is still a significant lack of integration of Big Data technologies with interactive visualization tools. This is to process and display traceability study data comprehensively. Existing frameworks fixate on traditional ways of handling data, or fail to offer scalable solutions for large datasets from diverse sources. Furthermore, the lack of attention to visual interpretability hinders translating complex analyses into strategic decisions for institutions. Approaches that rely on outdated methods often result in fragmented data, failing to provide the full picture needed for long-term planning. These shortcomings are not only technical, but also reflect a lack of vision for making data a tool for institutional transformation. To address these gaps, this study adopts Kimball's Four Steps

methodology for data warehousing, utilizes MongoDB as an efficient storage solution, and uses Tableau for dynamic visualizations. The approach aims to provide a new way of analyzing traceability studies, with increased analytical rigor and real practical utility. In doing so, this study seeks to close the gap and set the standard in utilizing data to support decision-making in higher education. A critique of the existing literature suggests that without a paradigm shift in data management and representation, institutions will continue to struggle to adapt to the demands of an increasingly data-driven era.

3. Research Method

This research adopts the Four-Step Kimball methodology to design and construct a data warehouse tailored for the analysis of alumni tracer studies. This approach is selected for its proven effectiveness in structuring data into a dimensional model that supports multidimensional analysis, enabling institutions to derive actionable insights from complex datasets. The methodology encompasses identifying business requirements, defining facts and dimensions, designing the dimensional model, and building and populating the data warehouse. Each step is meticulously executed to ensure that the resulting system aligns with the strategic objectives of evaluating graduate outcomes and enhancing educational quality at Politeknik Caltex Riau (PCR). The initial step involves identifying the business requirements that underpin the tracer study system. The primary goals are to gain a clear understanding of PCR graduates' performance in the workforce by assessing employment rates and skill relevance, to support management in crafting policies that elevate educational standards based on empirical data, and to produce strategic reports detailing alumni distribution and their alignment with industry demands. These objectives serve as the foundation for determining the type of data to be collected and the analytical framework needed to inform decision-making processes at the institutional level.

Following the identification of business needs, the next phase focuses on defining the facts and dimensions critical to the data model. Facts represent the quantitative metrics to be analyzed, including the number of employed alumni, their workplace locations, average income levels, and the vertical and horizontal alignment between their education and current employment. Dimensions, on the other hand, provide the categorical perspectives for analysis, comprising the Alumni Dimension (encompassing GPA, name, degree level, and source of tuition), Geography Dimension (covering city/regency, province, and country), Job Dimension (including current status, waiting period, and time range in months), and Company Dimension (detailing workplace hierarchy and company type). This structured delineation of facts and dimensions ensures that data can be examined from multiple angles to address the defined business questions effectively. The third step entails designing the dimensional model using a star schema, which features a central fact table linked to several dimension tables for efficient and rapid data analysis. The fact table, named Fact_Tracer_Study, includes columns such as ID_Alumni, ID_Lokasi, ID_Pekerjaan, ID_Perusahaan, and Keselarasan, storing the core quantitative data for analysis. The dimension tables are structured as follows: Dim_Alumni, which holds alumni identity and academic data; Dim_Geography, containing work location details such as district/city, province, and country; Dim_Employment, capturing sector and job type information; and Dim_Company, storing workplace and company type data. This star schema visually represents the relationships between the fact and dimension tables, facilitating seamless access and analysis of multidimensional data.

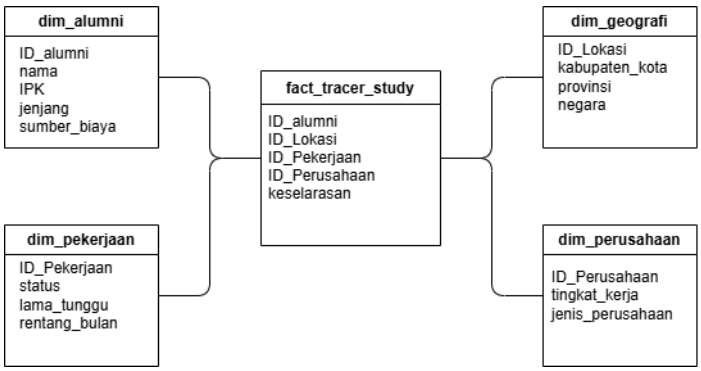

Figure 1. Star Schema

The final stage involves building and populating the data warehouse, a process that includes data validation, storage, and integration with visualization tools. The data utilized spans graduate tracer records from 2018 to 2022. Validation is conducted using Python, beginning with the import of necessary libraries such as pymongo, pandas, and json to load the tracer study data into the Python environment, with the first five

rows visualized using the head() function. Initial data cleaning involves removing irrelevant columns like "No" to streamline the dataset.

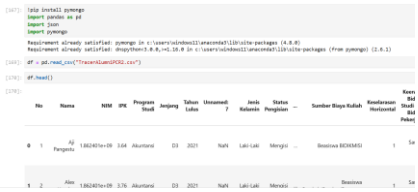

Figure 2. Read Data

Figure 3. Process Data

Figure 4. Clean Data Suggestion

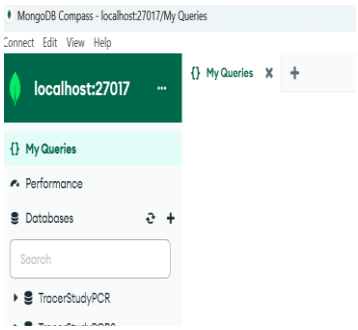

Figure 5. Connection

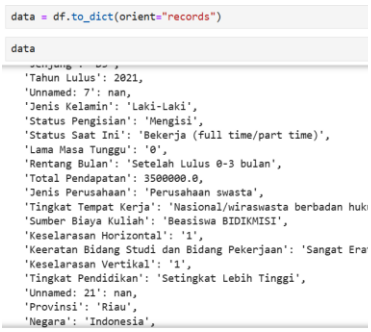

Figure 6. Save Data

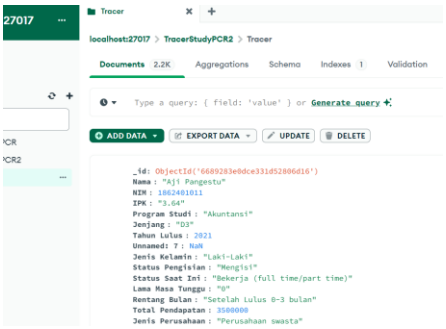

Figure 7. Database

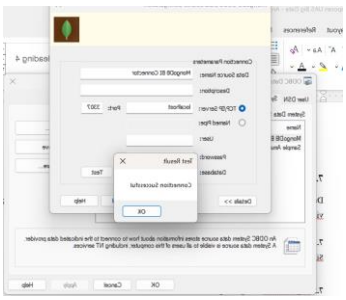

Figure 8. ODBC

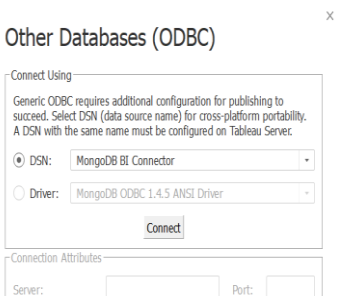

Figure 9. Select DSN

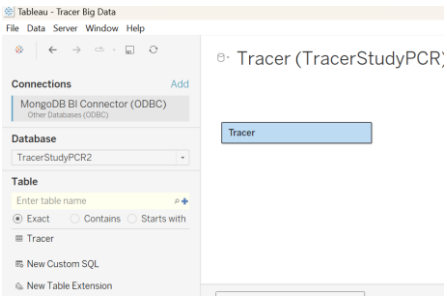

Figure 10. Display Tableau

Further cleaning targets the Suggestion column, leveraging the nltk library for tokenization, stemming, and stopword removal; this process includes converting text to lowercase, eliminating non-alphabetic characters via the regular expression re.sub(r'[^a-z\s]', '', text), and storing the refined output in a new column named Clean_Suggestion. Additional validation ensures consistency and accuracy across other data fields such as salary, employment status, and demographics. Post-validation, the data is stored in MongoDB for efficient management by establishing a connection using pymongo, verified through MongoDB Compass, preparing a database and collection, and loading the cleaned data into a collection named TracerStudyPCR2 within a database called Tracer using the insert_many function. To enable integration with external analytical tools, a driver connection is established via the ODBC application, named MongoDB BI Connector, using localhost on port 3307, with successful connectivity confirmed through testing. Finally, the MongoDB data is connected to Tableau for visualization by selecting the previously created Data Source Name (DSN), MongoDB BI Connector, and establishing the connection; upon successful linkage, a database named tracer study and a table named tracer appear in Tableau's interface, signaling readiness for the visualization process to commence.

4. Result and Discussion

4.1 Results

4.1.1 Tracer Study Filling Status

The completion rate of the tracer study conducted by Politeknik Caltex Riau (PCR) provides valuable insight into the engagement and awareness of alumni regarding the importance of such studies. Visualization of the data reveals a consistent and significant increase in participation over the years. Specifically, the completion rate rose from 35.67% in 2018 to an impressive 99.06% in 2022. This upward trend suggests a growing recognition among alumni of the tracer study's role in shaping institutional policies, improving educational quality, and providing critical feedback on graduate outcomes. The near-complete participation in 2022 reflects successful outreach efforts by PCR, possibly through enhanced communication strategies, digital

platforms for survey submission, or increased alumni networking initiatives. This high level of engagement ensures that the data collected is more representative of the alumni population, thereby strengthening the reliability of the insights derived for strategic decision-making.

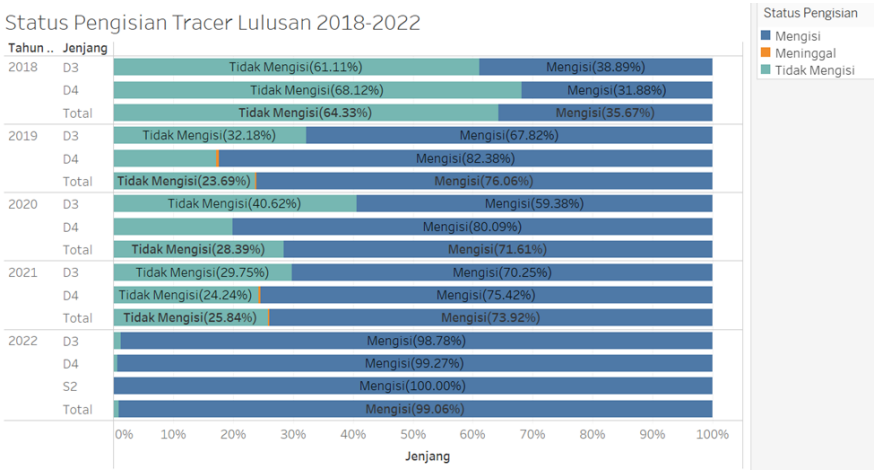

Figure 11. Filling Status

4.1.2 Geographical Distribution of Alumni

The geographical distribution of PCR alumni offers a comprehensive view of where graduates are employed after completing their education. According to the visualization of the data, a substantial 74.58% of alumni work within Indonesia, with the majority concentrated in Riau Province, accounting for 65.35% of the total. This significant presence in Riau indicates a strong connection between PCR graduates and local industries, likely due to the institution's focus on industry-relevant skills and partnerships with regional employers. Beyond Indonesia, a smaller but noteworthy portion of alumni are employed in neighboring countries such as Singapore and Malaysia. This international presence highlights the global competitiveness of PCR graduates and their ability to secure opportunities in dynamic, cross-border job markets. The distribution pattern also suggests potential areas for institutional focus, such as strengthening ties with international companies or tailoring programs to meet the demands of both local and global employment landscapes.

Figure 12. Countries Alumni Work

4.1.3 Relationship between GPA and Income

An analysis of the relationship between academic performance and post-graduation income among PCR alumni reveals insightful trends. The visualization of graduate income data indicates that the average earnings of PCR graduates fall within the range of 6-9 million IDR per month, a competitive figure within the regional context. Further correlation analysis demonstrates a positive relationship between Grade Point Average (GPA) and income levels, with alumni who achieved higher GPAs tending to secure higher-paying positions. This trend underscores the importance of academic excellence as a predictor of professional success, suggesting that a strong academic foundation equips graduates with the skills and credibility needed to excel in the workforce. However, other factors such as industry type, work experience, and networking may also influence income disparities, indicating that while GPA is a significant factor, it is not the sole determinant of financial

outcomes. These findings can inform PCR academic strategies, emphasizing the need for rigorous curricula and support systems to help students achieve higher academic performance.

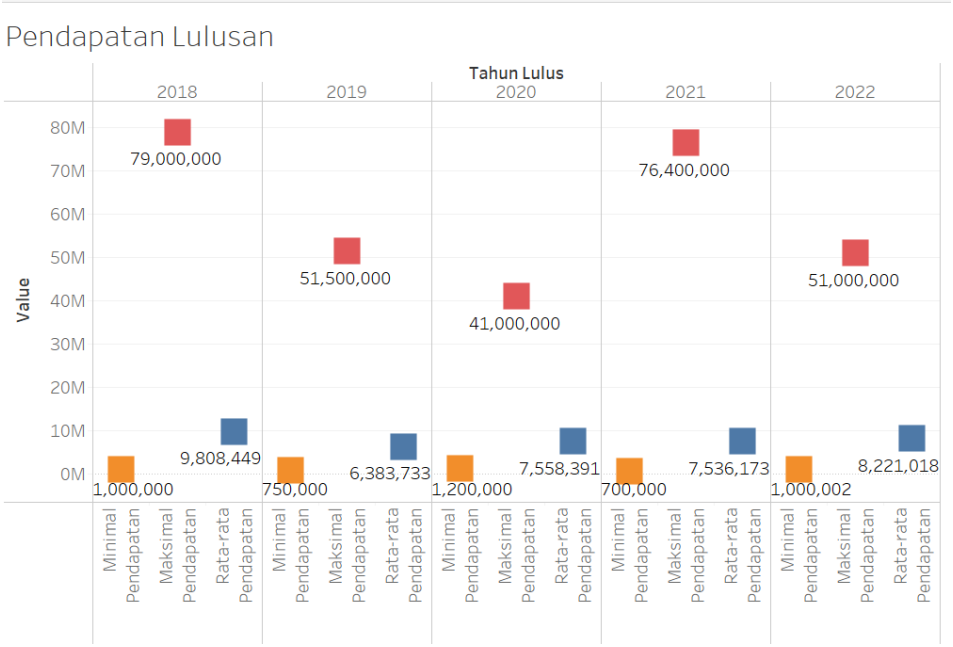

Figure 13. Graduate Income

4.1.4 Employment Status of Alumni

The employment status of PCR graduates across different graduation years provides a detailed perspective on their career trajectories. For the 2018 cohort, a significant proportion of alumni opted to continue their education rather than immediately entering the workforce, reflecting a preference for further skill enhancement or specialization. In contrast, subsequent years show a shift toward direct employment, with 72% of 2019 graduates securing jobs shortly after graduation. This trend of employment continues, though with slight fluctuations: in 2020, 51% of alumni were employed; in 2021, the figure rose slightly to 53.11%; and in 2022, it stood at 49.42%. These variations may be attributed to external factors such as economic conditions, industry demand, or shifts in graduate priorities over the years. The data suggests that while a majority of PCR alumni successfully transition into the workforce, there remains a notable segment that either pursues further studies or faces challenges in securing immediate employment, highlighting the need for targeted career support services and industry partnerships to facilitate smoother transitions into professional roles.

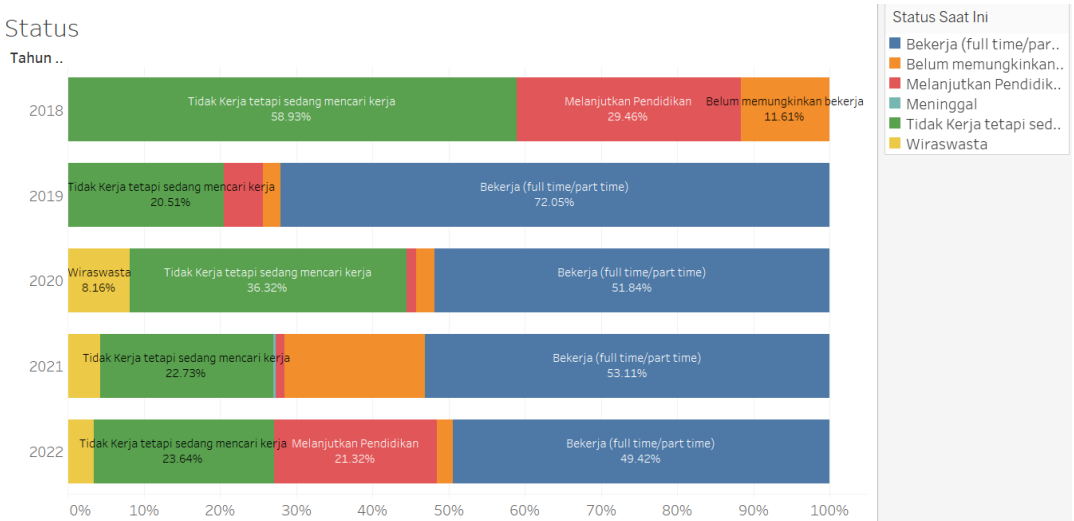

Figure 14. Jobs

4.1.5 Alignment of Education and Employment

Vertical alignment refers to the compatibility between the level of education attained by graduates and the minimum educational requirements for their current positions or roles in the workplace. Analysis of the

data shows that an impressive 75.81% of PCR alumni are employed in roles that align with their level of education. This high alignment rate indicates that the qualifications provided by PCR are well-recognized and appropriately matched to the demands of the job market, ensuring that graduates are neither overqualified nor underqualified for their positions. Such alignment is crucial for job satisfaction and career progression, as it reflects a balance between educational preparation and professional expectations. However, the remaining percentage of alumni working in roles below or above their educational level suggests potential areas for improvement, such as better career counseling or curriculum adjustments to meet specific industry needs.

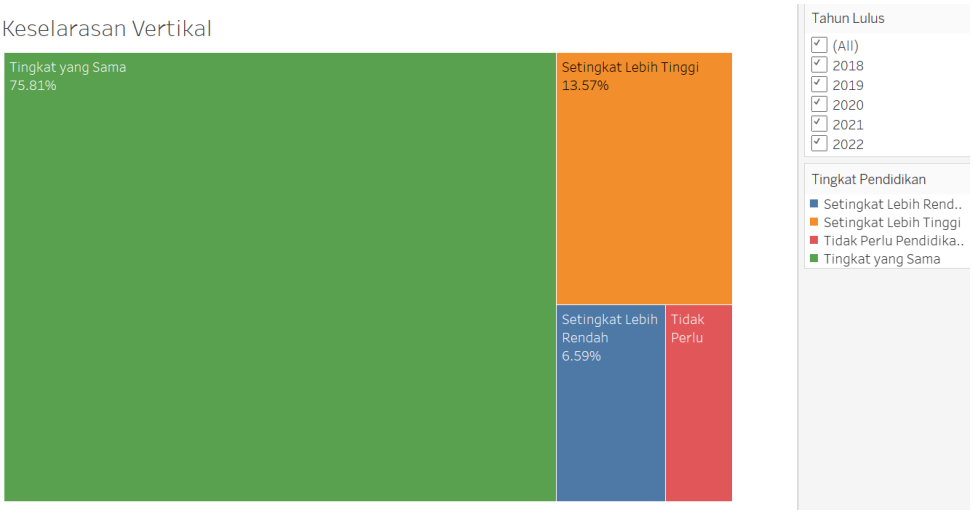

Figure 15. Vertical Alignment

Horizontal alignment measures the relevance of a graduate's field of study or academic discipline to their current field of work. The data reveals that 44.05% of PCR alumni are employed in fields directly related to their study programs, with notable variations across different disciplines. While this percentage indicates a moderate level of alignment, it also highlights that over half of the alumni work in areas outside their academic training. This discrepancy could stem from diverse factors, including limited job availability in specific sectors, personal career pivots, or the interdisciplinary nature of modern workplaces that require adaptable skill sets. For PCR, these findings underscore the importance of fostering versatile competencies alongside specialized knowledge, as well as enhancing industry-academia collaboration to ensure that study programs remain aligned with evolving market demands. Addressing these gaps could involve curriculum updates, internship opportunities, and alumni feedback integration to better prepare graduates for roles within their fields of study.

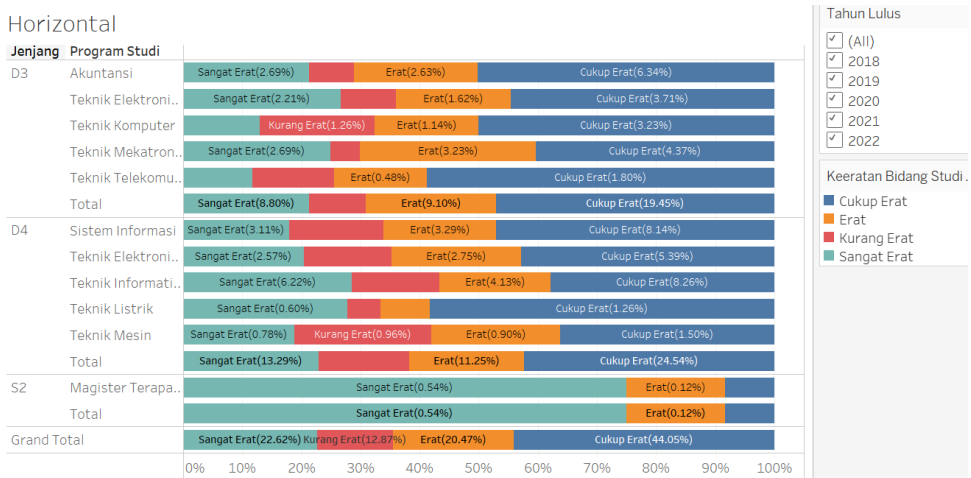

Figure 16. Horizontal Alignment

4.2 Discussion

The tracer study results from Politeknik Caltex Riau (PCR) reveal a striking surge in alumni participation, climbing from 35.67% in 2018 to an almost complete 99.06% by 2022. Such a leap signals a sharp rise in awareness among graduates about the value of these surveys for shaping institutional growth and educational quality. Drawing from Sitorus *et al.* (2023), such studies are vital for gathering reliable data to guide strategic decisions in higher education [1]. The near-total response rate in 2022 likely stems from smarter outreach, possibly through digital survey tools, a method echoed in Nugroho & Arifudin (2024) with their digital mapping

system for tracking alumni [14]. Yet, the question remains: does such high participation truly translate to actionable outcomes, or does it simply inflate data volume without refining focus on critical gaps. Geographically, 74.58% of PCR alumni remain employed within Indonesia, with 65.35% rooted in Riau Province, pointing to a tight bond with local industry needs, likely fueled by PCR emphasis on relevant skills. Susanti & Wibawa (2021) note a similar pattern where graduates often stay close to their institutions due to regional partnerships [2]. Meanwhile, a smaller fraction working in Singapore and Malaysia suggests a competitive edge on a global scale, as Yorasaki & Sari (2022) observe in other institutional cases [8]. Still, is PCR capitalizing enough on global opportunities, or is the focus on local ties limiting broader reach. Analyzing academic performance against earnings, a clear link emerges: higher GPA correlates with better income, with most PCR graduates earning between 6-9 million IDR monthly. Trimurtini *et al.* (2019) argue that academic metrics like GPA often serve as initial gauges of competence for employers [6]. However, Damayanti (2018) cautions that industry type and experience also weigh heavily on salary variations, especially in non-educational sectors [10]. If GPA drives earnings, why isn't PCR pushing harder for academic rigor paired with real-world exposure to balance the equation.

Employment trends across graduation years paint a mixed picture. In 2018, many chose for further studies over immediate work, yet by 2019, 72% entered jobs. The numbers dip to 51% in 2020, rise slightly to 53.11% in 2021, and fall again to 49.42% in 2022. Wasito & Birowo (2022) ties such fluctuations to shifting job market dynamics [4], while Sukardi (2015) stresses the need for robust career guidance to ease workforce entry [3]. Why, then, do employment rates waver so much year to year? Is PCR failing to adapt support systems to external economic pressures. On alignment between education and employment, 75.81% of alumni hold positions matching their qualification level, a strong indicator of market recognition, as Taufiq *et al.* (2018) suggests [5]. Yet, only 44.05% of work in fields tied to their specific studies, exposing a glaring disconnect. Sari & Yorasaki (2022) point to scarce job openings in niche sectors as a key factor [9]. Shouldn't PCR rethink curriculum design to either broaden skill sets or target industries with actual demand, rather than churning out graduates for mismatched roles. Leveraging technology, PCR tracer study system aligns with modern data approaches outlined by Kimball & Ross (2013) through dimensional modeling [20]. Tools like Tableau for visualization and MongoDB for storage resonate with Muntean & Surugiu (2020) on NoSQL's role in analytics [18]. Aritonang *et al.* (2025) further back the use of dashboards for real-time tracking [16]. But are these systems merely flashy add-ons, or do they genuinely sharpen decision-making to address the apparent mismatches in graduate outcomes. PCR tracer study exposes both strengths and persistent flaws. Participation and local employment stand out, yet global outreach, employment consistency, and field relevance lag. Relying on works like Sitorus *et al.* (2023) [1], and Susanti & Wibawa (2021) [2], the path forward demands not just data collection but ruthless prioritization of reforms—academic, industrial, and technological—to ensure graduates aren't just numbers but real assets in a brutal job market.

5. Conclusion

This initiative effectively leverages Big Data and Tableau technologies to streamline and analyze Polytechnic Caltex Riau (PCR) alumni tracer study data from 2018 to 2022. Applying Kimball's Four-Step methodology, raw, multifaceted data is transformed into clear, interactive visual representations that aid strategic understanding. A remarkable surge in tracer study engagement is notable, with participation rates rising to an impressive 99.06% in 2022, reflecting the growing recognition of graduates for the value of the survey, although the sheer volume of responses necessitated rigorous screening to prioritize data quality over quantity. Geographically, 74.58% of alumni remain employed in Indonesia, with 65.35% based in Riau Province, highlighting PCR's strong connection to regional industry needs, while a small portion work overseas hinting at global competitiveness; however, the large local focus suggests the need to expand international networks for diverse opportunities. In terms of educational alignment, 75.81% of alumni secured roles that matched their qualification level, validating academic standards, but only 44.05% secured jobs related to their specific field of study, revealing a critical mismatch that challenges PCR to rethink curriculum relevance and target sectors that are in high demand. Furthermore, the strong correlation between higher GPA and salary—often ranging between IDR 6-9 million per month—reaffirms the weight of academic performance, although it also underscores the need to enhance skills and practical experience to balance how graduates are evaluated by employers. Employment rates show troubling fluctuations, peaking at 72% for the 2019 cohort but dropping to 49.42% in 2022, indicating inconsistent market absorption that PCR must address through adaptive career support. These findings collectively call for strategic reforms in curriculum design, industry collaboration, and career services to ensure graduates are not only equipped with degrees but are also truly competitive in a demanding job landscape, while also encouraging PCR to leverage its data systems for sharper decision-making rather than simply showing off technology.

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