THE ROLE OF ANALYTICAL AND VISUALIZATION DATA TO OPTIMIZE ONLINE SALES

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ABSTRACT

Data analytics is a crucial component in increasing sales and business profitability in the digital age. Leveraging data analytics allows businesses to better understand market trends and develop more effective marketing strategies. Several studies show that businesses that use data analytics experience significant revenue increases and improved operational efficiency. Through the use of analytics tools, businesses can gain insights from customer data, from purchase history to interactions with digital platforms, enabling more accurate and informed decisions. There are three steps in the data analytics process: data collection, data processing, data analysis, and data interpretation. Data analytics illuminates how a business operates by helping customers understand their needs, analyzing their resources, and creating a solid foundation for decision-making. The target outputs of this activity are publications in international/national journals/proceedings, IPR/IPR, and publications on social media.

Keywords: *Certification; Competent; Data Scientists; Data Analytics*

ABSTRAK

Analisis data merupakan komponen krusial dalam meningkatkan penjualan dan profitabilitas bisnis di era digital. Memanfaatkan analisis data memungkinkan bisnis untuk lebih memahami tren pasar dan mengembangkan strategi pemasaran yang lebih efektif. Beberapa studi menunjukkan bahwa bisnis yang menggunakan analisis data mengalami peningkatan pendapatan yang signifikan dan peningkatan efisiensi operasional. Melalui penggunaan perangkat analisis, bisnis dapat memperoleh wawasan dari data pelanggan, mulai dari riwayat pembelian hingga interaksi dengan platform digital, sehingga memungkinkan pengambilan keputusan yang lebih akurat dan tepat. Ada tiga langkah dalam proses analisis data: pengumpulan data, pemrosesan data, analisis data, dan interpretasi data. Analisis data menjelaskan cara bisnis beroperasi dengan membantu pelanggan memahami kebutuhan mereka, menganalisis sumber daya mereka, dan menciptakan landasan yang kokoh untuk pengambilan keputusan. Hal ini juga meningkatkan efisiensi operasional dan manajemen risiko, mendorong inovasi dan pertumbuhan jangka panjang. Target output dari kegiatan ini adalah publikasi dalam jurnal/proses internasional/nasional, IPR/HKI dan publikasi di media sosial.

Kata Kunci: Sertifikasi; Kompetensi; Ilmuwan Data; Data Analitik

1.   INTRODUCTION

Among Malaysia's states, Penang Island ranks as the second smallest in terms of total area, just after Perlis. However, it leads the country in terms of population density (Priambodo et al., 2024). Additionally, it has the smallest percentage of Malay and Muslim residents when compared to other regions in Malaysia. The name "Penang" is derived from the areca palm tree, which historically grew abundantly on the island (YULIAWATI, 2024). The state is divided into two geographical

parts: the island region in the west, covering approximately 293 square kilometers, and the mainland portion on the western coast of the Malaysian peninsula, which spans around 760 square kilometers (Prasetyo et al., 2022). The island was first colonized by the British under Captain Francis Light in 1786 and has since become one of the nation's most prosperous and modernized areas.

A lesser-known fact is that a large number of Indonesians also reside in Penang. To support this community, they have formed a non-political, non-governmental group called *Pertubuhan Masyarakat Indonesia Pulau Pinang* (PERMAI). The organization focuses on social, cultural, and educational initiatives. Its members come from diverse backgrounds, including Indonesian workers, professionals, educators, students, and academics living in Malaysia (Siswanti et al., 2024).

PERMAI is a non-political and non-governmental organization that focuses on social, educational, and cultural development (SETIYAWATI et al., 2025). Its members are made up of Indonesian citizens residing in Malaysia, including expatriates, entrepreneurs, academics, educators, students, and workers (HIDAYAH et al., 2024). The organization is composed of individuals from various regions and social strata across Indonesia, each with diverse professional and cultural backgrounds.

In the business world, data processing plays a crucial role (Huda & Chowanda, 2021). Accurate and relevant data enables companies to extract valuable insights that support decision-making (Sebastian et al., 2021). To achieve this, appropriate analytical methods must be applied (Prasetyo et al., 2022). Professionals such as Data Analysts and Data Scientists are responsible for managing and interpreting this data (Gathani et al., 2025). Regardless of industry, modern businesses increasingly rely on data-driven strategies to shape their future plans (Lee & Yoon, 2025). To ensure effective analysis, companies must maintain efficient data storage systems that support seamless access and processing.

2.   METHODS

Stages of Implementation:

In Februaty, 2025, an initial coordination meeting was conducted virtually via Zoom involving KKRPM, the Head of LPPM, and their respective teams. This stage results in directives from LPPM in accordance with the Regulation of the Minister of Education, Culture, Research, and Technology.

The second virtual meeting was held on May 4, 2025, involving the PKM Team, PERMAI representatives, and the Head of the LPPM at Mercu Buana University. The purpose of this meeting was to gather detailed information regarding the specific needs and expectations of PERMAI partners.

The next phase involved identifying the necessary data and materials required to support knowledge sharing, learning, and training activities, following the approach suggested by Brownlee (Brownlee, 2020).

The training session was conducted using two primary formats:

a. Presentation: This included the following topics:

- Overview and introduction
- Relevant previous studies or background
- Practical case examples
- Advantages and disadvantages

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b. Interactive Q&A Session: Participants were given the opportunity to ask questions and engage in discussions related to the field of Data Science, in line with guidelines from the Directorate General of Higher Education, Research, and Technology (2025).

Several preparatory steps were carried out before the implementation of the program, including:

1. Conducting a site survey for the activity
2. Preparing a proposal for the community service initiative
3. Developing and finalizing the training module to be distributed to participants

The program was carried out as an in-person event held on Penang Island. An evaluation session was conducted at the conclusion of the activity. Participants were required to complete a short assessment to measure their understanding of the material presented, allowing for an evaluation of the program's effectiveness.

3. RESULTS

On Sunday, May 4, 2025 at the Office of the Indonesian Community Organization in Pinang, Malaysia, a community service activity was carried out. The speakers in this Community Service activity were a Team of Lecturers from the Faculty of Computer Science, Mercu Buana University and speakers from PERMAI Pinang and attended by students, Indonesian citizens working on Penang Island, Malaysia and MSME actors in Pinang, Malaysia. Community Service Activities on Penang Island, Malaysia. This activity has run well and smoothly, as seen in Figure 1.

Figure 1 Participants and Lecturers and Organizers of PkM Activities

Based on gender, the participants were predominantly female, with 12 participants, or approximately 52.2%. Eleven were male, or approximately 47.8%, as shown in Figure 3.
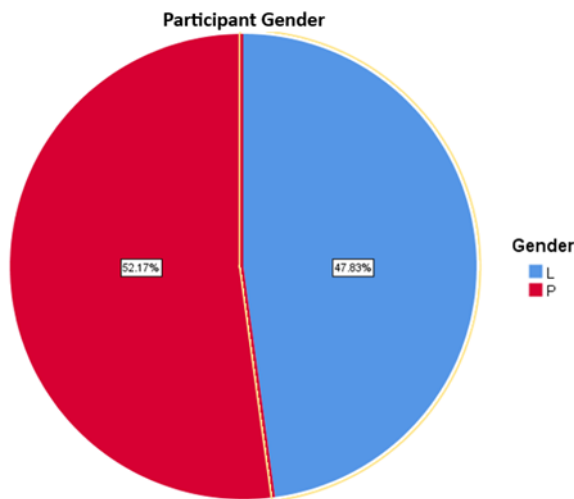
Figure 3 Participant Gender

Based on occupation, most of them are students and 10 people have other jobs, 3 people work as self-employed, 3 people are housewives, 3 people are housekeepers, 2 people are laborers, 1 person is a cleaning service, 1 person is a private company and 1 person works in traditional medicine.
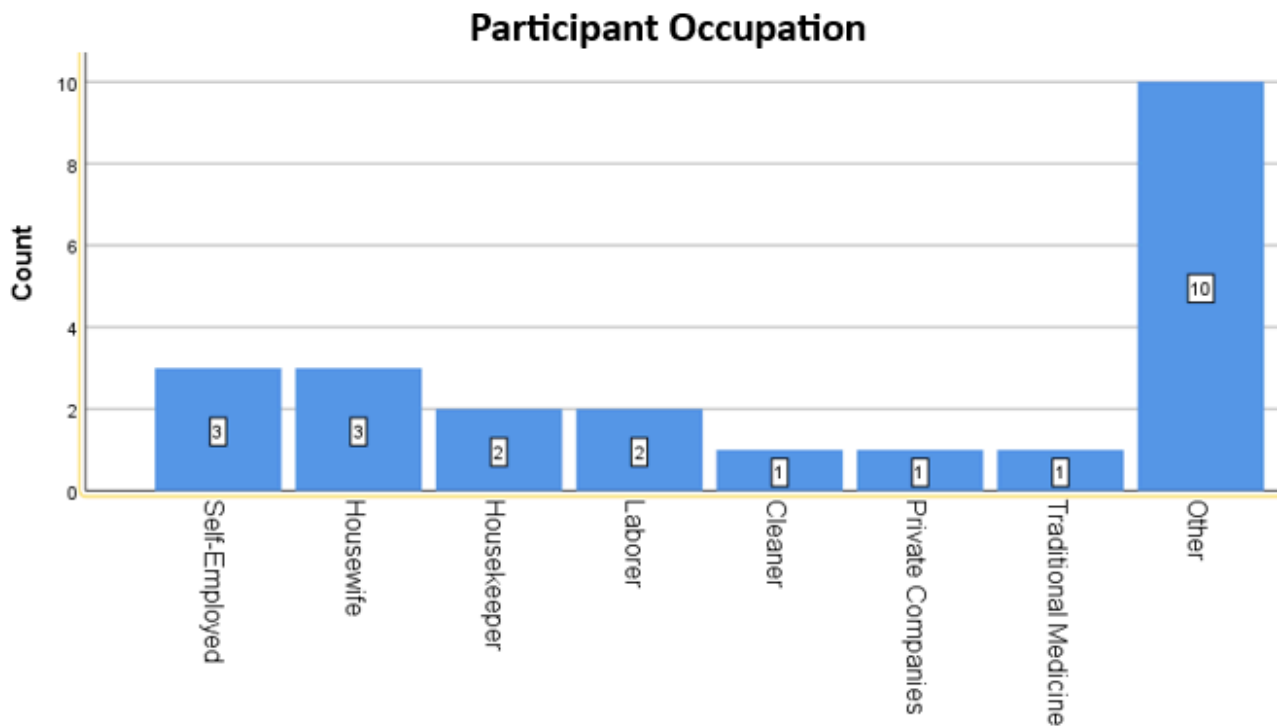

Figure 4 Participant Occupation

Usia peserta berkisar antara 13 tahun hingga 67 tahun, seperti yang ditampilkan pada Gambar 5
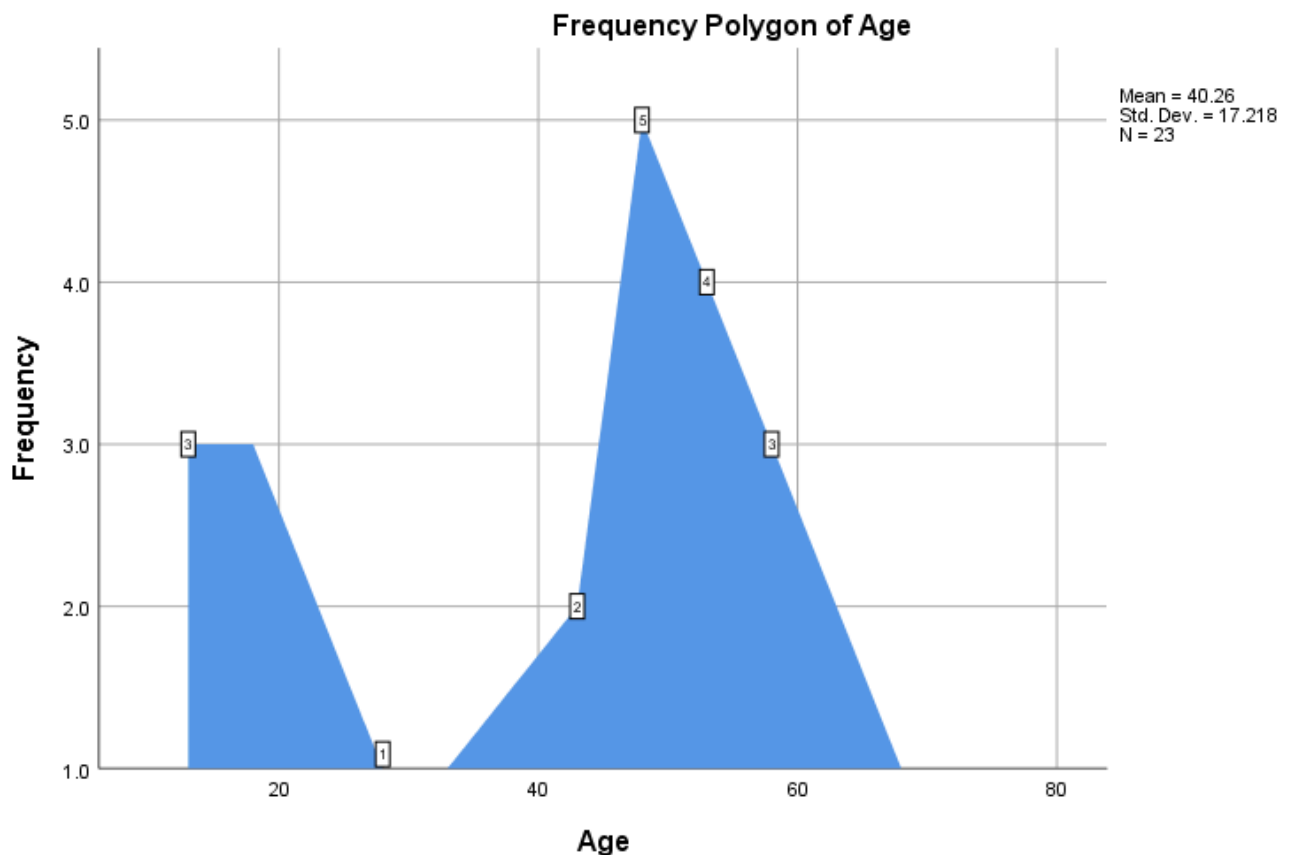
Figure 5. Participant of Age

4.   CONCLUSION

The Community Service Program on Penang Island, Malaysia, was conducted by the Faculty of Computer Science, Mercu Buana University, attended by 23 participants who are Indonesian citizens domiciled on Penang Island, Malaysia. The implementation of this Community Service Program went smoothly, according to expectations. Good coordination between LPPM Mercu Buana University and Permai Malaysia as a Partner was very helpful in this activity. Participants played a very active role in participating. Some participants felt the need to get more complete material and were interested in this new activity, then requested that this activity be held regularly.

5.   AKNOWLEDGEMENT

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