Jurnal Mantik, 7 (1) (2023), ISSN 2685-4236 (Online)

Published by:Institute of Computer Science (IOCS)

Jurnal Mantik

Journal homepage: www.iocscience.org/ejournal/index.php/mantik

Data visualization of the proportion of youth and adults in Indonesia with computer information technology skills

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A R T I C L E I N F O

Article history:

Received Apr 15, 2023
Revised Apr 24, 2023
Accepted May 18, 2023

Keywords:

Data Visualization
ICT Capabilities of Youth and Adults in Indonesia
Google Data Studio
Human resources in the ICT field

ABSTRACT

In the Industrial Revolution 4.0, which integrates information and communication technologies into industry, information and computer technology skills are crucial. These abilities help people use technology and get better jobs. In the increasingly competitive digital age, computer information technology abilities improve a nation's competitiveness globally. These skills can reduce Indonesia's youth and adult unemployment rates. The study visualizes data on the proportion of adolescents and adults with information and computer technology (ICT) skills by province in Indonesia to determine the percentage of equal distribution of ICT skills to improve the quality of human resources in ICT. The data visualization of Adolescents and Adults with Information and Computer Technology Skills (ICT) in Indonesia showed that DI Yogyakarta had the highest percentage at 98.74%, indicating that most of the population has ICT skills. Papua province has the lowest proportion, 33.06%, indicating that most locals lack IT and computer abilities.

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1. INTRODUCTION

Information Technology and Computer skills are one of the demands because the world is currently entering the 4.0 revolution era. The era of revolution 4.0 or what is often called the cyber physical system is a combination of information and communication technology into the industrial sector. In facing the 4.0 revolution era, of course we must have information and communication technology skills with the aim that we can understand existing technological developments and we can apply them in our daily lives. With the skills possessed in dealing with developments in the 4.0 revolution era, you can create new technologies or tools that can simplify and increase efficiency in completing a job at this time or can be useful in the future(Dharmalau et al., 2022; Syahrial et al., 2022).

In today's digital era, computer information technology skills are very important for many people, especially for youth and adults in Indonesia. These skills can help

improve the quality of life, provide better job opportunities, and facilitate access to various necessary information. The importance of computer information technology skills in the digital era can also be seen from their role in various sectors, such as education, business and industry(Dharmalau et al., 2022; Fauzi et al., 2023; Nasri et al., 2022). These skills are an absolute requirement in carrying out certain jobs, such as data processing, graphic design, and software development.

In a global context, computer information technology skills are also an important factor in increasing the nation's competitiveness in the digital era. Along with advances in technology and globalization, competition in various fields is getting tougher and requires higher skills(Afni, 2016; Sopian et al., 2023). Computer information technology skills are one of the determining factors in determining Indonesia's position in the global arena.

The social impact, namely being able to improve computer information technology skills, can also help reduce the unemployment rate in Indonesia, especially among youth and adults(Ningtyas et al., 2022; Simanjuntak et al., 2023). By having these skills, they will have greater opportunities to get better jobs (Ningtyas et al., 2023; Tutik & Rosadi, 2022), improve their standard of living, and contribute to nation building.

In addition, Indonesia is currently trying to improve the quality of human resources in the field of information and communication technology. This can be seen from various government and private programs that emphasize the importance of computer information technology skills for the Indonesian people(Sari et al., 2022; U. Usanto et al., 2021), especially for youth and adults. However, this effort is still faced with various challenges, such as the gap between the quality of education in urban and rural areas, as well as the limited availability of infrastructure and internet access in some areas.(Muhammad Wali et al., 2023; Nurlaela et al., 2023; Sopian et al., 2022; Supriyanto et al., 2021).

Some previous research related to data visualization is by (Azis et al., 2022) which visualizes time series data on tourist visits, other research by (Angreini & Supratman, 2021) which visualizes data on disaster-prone locations, and research that utilizes google data studio in data visualization, namely research by (Fernando, 2018). Based on previous research, it can be explained that data visualization is very important in providing information with graphs by utilizing google data studio tools, the difference in research lies in the data processed and producing visualizations, in this study using data on the Proportion of Adolescents and Adults Aged 15-24 Years With Information Technology and Computer (ICT) Skills by Provinces in Indonesia, 2011-2022 and other differences lie in the visualization results, namely there is a distribution graph of ICT skills in provinces in Indonesia.

Therefore the urgency of the research is that it is necessary to visualize data regarding the proportion of youth and adults in Indonesia who have computer information technology skills that can provide a clear picture of current conditions and become a reference in planning strategies to improve the quality of human resources in the field of information and communication technology in Indonesia. Research objectives can visualize data regardingProportion of Adolescents and Adults Aged 15-24 Years With Information Technology and Computer (ICT) Skills by Provinces in Indonesia, 2011-2022", and data number 8 with the title "Proportion of Adolescents and Adults Aged 15-24 Years With Information Technology and Computer Skills (ICT) by Gender, 2011-2022who have computer information technology skills. The data used comes from various reliable sources, namely the Indonesian Central Bureau of Statistics.

2. RESEARCH METHOD

The object of this study uses data Proportion of Adolescents and Adults Aged 15-24 Years With Information Technology and Computer (ICT) Skills by Provinces in Indonesia, 2011-2022", and data number 8 with the title "Proportion of Adolescents and Adults Aged 15-

24 Years With Information Technology and Computer Skills (ICT) by Gender, 2011-2022 sourced from the website of the Indonesian Central Bureau of Statistics. In visualizing data using a data analysis and reporting platform, namely Google Data Studio. This platform makes it easy for users to combine data from various sources, perform data processing and create visual reports that are interactive and easy to understand (Azis et al., 2022; Google, 2016; Sudipa et al., 2023; S. Usanto, 2022).The data collection method uses secondary data collection by collecting data from the Central Bureau of Statistics and conducting literature studies from reference books and scientific articles related to data visualization.

There are research stages which can be seen in Figure 1 below.

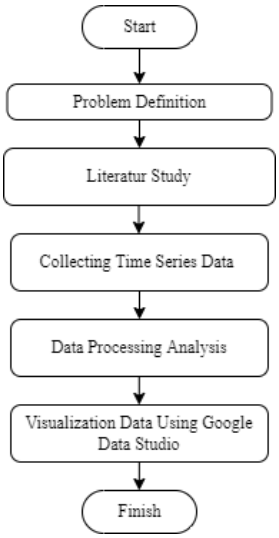

Figure 1. Research Stages

In the research stage, stages are carried out in collecting data to produce data visualizations so that Based on Figure 1, it can be explained by starting with a literature study using time series data visualization. Identify the problem by collecting data on the Proportion of Teenagers and Adults Aged 15-24 Years with Information Technology and Computer (ICT) Skills by Province in Indonesia, 2011-2022 from the website of the Central Statistics Agency. The data obtained in the Microsoft excel spreadsheet extension, the next process is to carry out data processing analysis by carrying out clusters and categories from Adolescents and Adults with Information Technology and Computer Skills. The final process is to visualize data on Youth and Adults with Information Technology and Computer Skills in all provinces in Indonesia using the graphs provided on the Google Data Studio platform to visualize the graphs.

3. RESULTS AND DISCUSSIONS

3.1. Data analysis

Data on the proportion of adolescents and adults aged 15-24 years with Information Technology and Computer (ICT) skills by province in 2022 is taken from the Central Statistics Agency (BPS). In this data there is a percentage of the proportion of adolescents and adults with Information Technology and Computer Skills by province in 2022. Then this data is visualized into several diagrams, which can be seen in the image

below. From the diagram it can be seen that there has been an increase and decrease in the percentage of the population who have ICT skills.

Table 1. Data on the Proportion of Youth and Adults with ICT Skills by Provinces in Indonesia.

No	Province	2020 year	Year 2021	Year 2022
1	aceh	76,68	83,84	85,72
2	North Sumatra	82.51	89.79	92,83
3	West Sumatra	84,73	92.04	94.21
4	Riau	84,61	93,14	94.95
5	Jambi	86.06	91.03	93.63
6	South Sumatra	83,31	90.45	92.77
7	Bengkulu	80,69	90.44	94.03
8	Lampung	85,18	92.42	93.98
9	Kep. Bangka Belitung	87,10	94.21	96,11
10	Kep. Riau	90.65	97.33	96.52
11	DKI Jakarta	95.85	98.37	97.37
12	West Java	92,14	94,69	95.61
13	Central Java	94.02	96.56	97.44
14	In Yogyakarta	98.22	99.07	98.74
15	East Java	90,93	93.65	95.34
16	Banten	88.47	93.03	94.49
17	Bali	94.75	97,23	96,69
18	West Nusa Tenggara	81,17	88.55	91.58
19	East Nusa Tenggara	58,40	75,20	77.30
20	West Kalimantan	78.07	86,63	89.49
21	Central Kalimantan	83.94	90,18	91.32
22	South Kalimantan	90.59	94.95	96,28
23	East Kalimantan	91.39	95.78	97.57
24	North Kalimantan	88,29	94.46	95.31
25	North Sulawesi	84,93	90.53	91.69
26	Central Sulawesi	76,52	85,82	86.96
27	South Sulawesi	88.78	94,10	94.81
28	Southeast Sulawesi	84,21	91.69	92,82
29	Gorontalo	82.70	90,80	93.06
30	West Sulawesi	74,15	85,15	90.41
31	Maluku	65,83	77.55	78.51
32	North Maluku	62,11	70,33	77,48
33	West Papua	70,93	74,27	76,29
34	Papuan	39.06	34.95	33.06

Table 2. Data on the proportion of adolescents and adults with ICT skills by sex.

Gender	Year 2022
Man	93,22
Woman	93,20

3.2. Data Visualization

At the data visualization stage then

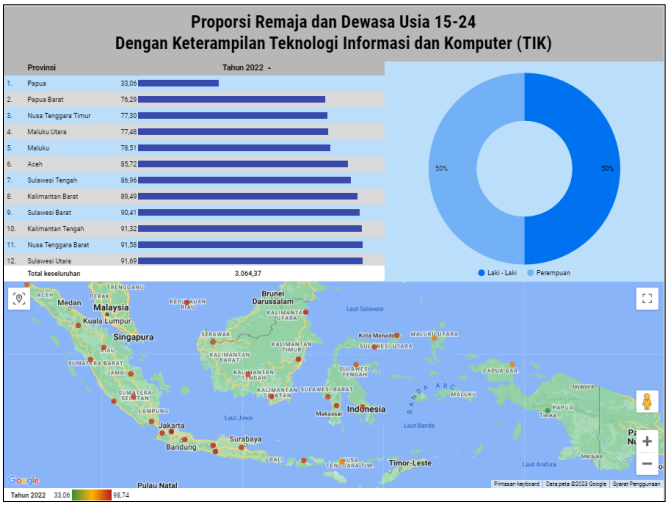

Figure 2. Results of Data Visualization

Based on Figure 2, it can be seen that there is visual data related to the proportion of adolescents and adults aged 15-24 years with Information Technology and Computer (ICT) skills by province in 2022. There is a graph of the recapitulation of youth and adults and their distribution in each region in Indonesia. Explanation of the visualization results can be explained in the following figure.

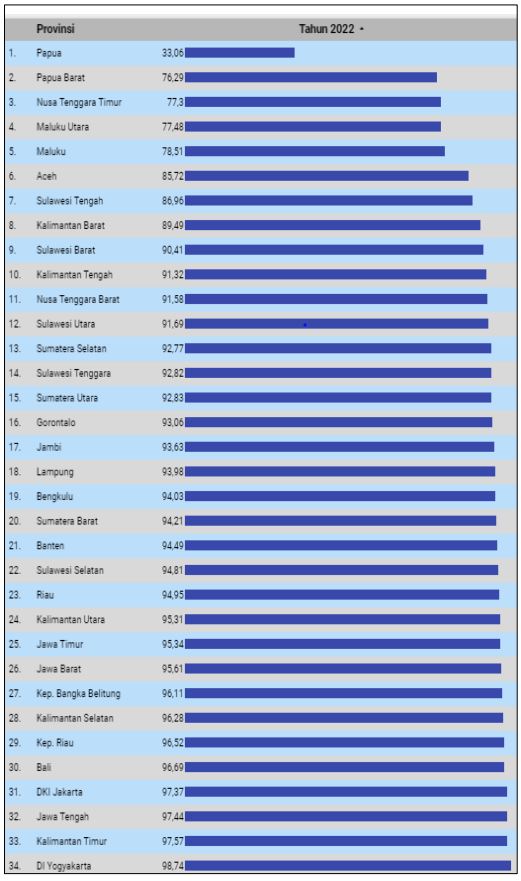

Figure 3. Graphic visualization

Figure 3 above is a table diagram with rows. From the table on the percentage of youth and adults with ICT skills in 2022 above, it can be seen that: (a) The highest percentage was found in the DI Yogyakarta province, which was 98.74%, this value reflects that the majority of the DI Yogyakarta province's population already has skills related to Information Technology and Computer knowledge. (b) The lowest percentage was found in the province of Papua, which was 33.06%, this value reflects that most of the population of the province of Papua do not yet have skills related to Information Technology and Computer knowledge.

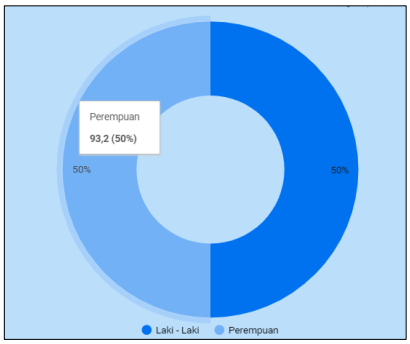

Figure 4. Percentage of Gender

Figure 4 above is a pie chart illustrating the percentage of male and female population with Information and Communication Technology (ICT) skills aged 15-24 from 34 provinces in Indonesia in 2022. The above diagram shows that the percentage of male and female population women have the same value of 50%, because from the existing data the percentage between men and women has a value difference of 0.2%: (a) The percentage of the female population is 93.22%, this percentage is greater than the percentage of the male population with a difference of 0.2%. (b) The percentage of the male population is 93.20%, this percentage is smaller than the percentage of the female population with a difference of 0.2%.

Figure 5. Distribution Visualization

Based on Figure 5 it can be explained thatThe highest percentage was found in the DI Yogyakarta province, which was 98.74%, this value reflects that the majority of the DI Yogyakarta province's population already has skills related to Information Technology and Computer knowledge.

4. CONCLUSION

Based on the results of visualizing data on adolescents and adults with information technology and computer (ICT) skills throughout Indonesia, it can be concluded that the

highest percentage is in the DI Yogyakarta province, namely 98.74%, this value reflects that most of the DI Yogyakarta province population has skills related to Information Technology and Computer knowledge. The lowest percentage was found in the province of Papua, which was 33.06%, this value reflects that most of the population of the province of Papua do not yet have skills related to Information Technology and Computer knowledge. Future research suggestions are to apply data mining so as to produce a classification of the ICT capabilities of provinces in Indonesia, as well as update time series data.

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