

## **BUSINESS INTELLIGENCE APPLICATIONS ON HOUSEHOLD EXPENDITURE SURVEY OF 2016 AND 2019**

*(Aplikasi Kecerdasan Perniagaan Mengenai Kajian Perbelanjaan Isi Rumah Tahun 2016 dan 2019)*

SERAH LATHAN A/L SATHIAMOORTHY, SITI NOOR ASYIKIN BINTI MOHD RAZALI\*,  
MUHAMMAD AMMAR SHAFI & ROSSHAIRY ABD RAHMAN

### *ABSTRACT*

According to The Malaysia Reserve, following the implementation of the new RM1,500 minimum wage, prices of basic items in the country will likely rise by 50 percent to 60 percent beginning in June. This will affect the manufacturing cost. Due to increased manufacturing costs and inflation, beverage firms have been under a great deal of pressure to boost their pricing. This will impact the Malaysian household expenditure. The spending of consumer will increase drastically. Therefore, a proper study must be conducted on the expenditures among Malaysian people to understand the trend and current statistics of various races, income, occupation, and education level. In this research, descriptive analysis, tree decomposition method, and scatter plot clustering has been applied to examine household expenditure. Microsoft Power Business Intelligence (Power BI) has been applied as a tool to visualize the statistic, pattern or trends that could be explored through an attractive dashboard. The dashboard represents the monthly expenditure averages by state, marital status, strata, and gender. In addition, average total income and expenditures by occupation, ethnicity, highest level of education, and industry also presented that could be explored by user in detail. Result shows that the income and expenditures in Malaysia have been increased from 2016 to 2019. According to the ethnicity, Chinese concur the highest monthly expenses in both 2016 and 2019 compared to other races. Meanwhile based on industry, activities of household as employers has the highest expenses and occupation as a manager is also represents the highest income as well as highest monthly expenses. Furthermore, based on education level, Malaysian people who studied until degree and above has highest average income and expenses monthly. Future works could be done by analyzing factors that affect the increases of expenses among Malaysian people.

*Keywords:* analyze; descriptive; business intelligence; Power BI

### *ABSTRAK*

Perbelanjaan pengguna telah meningkat secara mendadak. Oleh itu, kajian yang sewajarnya perlu dilakukan terhadap perbelanjaan dalam kalangan rakyat Malaysia untuk memahami trend dan statistik semasa pelbagai kaum, pendapatan, pekerjaan dan tahap pendidikan. Dalam penyelidikan ini, analisis deskriptif, kaedah penguraian pokok, dan pengelompokan plot taburan telah digunakan untuk mengkaji perbelanjaan isi rumah. Microsoft Power Business Intelligence (Power BI) telah digunakan sebagai alat untuk menggambarkan statistik, corak atau trend yang boleh diterokai melalui papan pemuka yang menarik. Papan pemuka mewakili purata perbelanjaan bulanan mengikut negeri, status perkahwinan, strata dan jantina. Di samping itu, purata jumlah pendapatan dan perbelanjaan mengikut pekerjaan, etnik, tahap pendidikan tertinggi dan industri juga dibentangkan yang boleh diterokai oleh pengguna secara terperinci. Keputusan menunjukkan bahawa pendapatan dan perbelanjaan di Malaysia telah meningkat dari 2016 hingga 2019. Mengikut etnik, Cina bersetuju dengan perbelanjaan bulanan tertinggi pada 2016 dan 2019 berbanding kaum lain. Manakala berdasarkan industri, aktiviti isi rumah sebagai majikan mempunyai perbelanjaan tertinggi dan pekerjaan sebagai pengurus juga mewakili pendapatan tertinggi serta perbelanjaan bulanan tertinggi. Tambahan

pula, berdasarkan tahap pendidikan, rakyat Malaysia yang belajar sehingga ijazah dan ke atas mempunyai purata pendapatan dan perbelanjaan bulanan tertinggi. Kerja masa hadapan boleh dilakukan dengan menganalisis faktor-faktor yang mempengaruhi peningkatan perbelanjaan dalam kalangan rakyat Malaysia.

*Kata kunci:* analisis; deskriptif; kecerdasan perniagaan; Power BI

## References

- Ahmad Z. & Fatima A. 2011. Prediction of household expenditure on the basis of household characteristics. In *Proc. ICCS-11*, pp. 351–367.
- Boobier T. 2018. *Advanced Analytics and AI: Impact, Implementation, and the Future of Work*. 1st Ed. United Kingdom: John Wiley & Sons, Ltd.
- Cingano F. 2014. Trends in income inequality and its impact on economic growth. *OECD Social, Employment, and Migration Working Papers*, No. 163. Paris: OECD Publishing.
- Dogan O., Kaya G., Kaya A. & Beyhan H. 2019. Catastrophic household expenditure for healthcare in Turkey: Clustering analysis of categorical data. *Data* **4**(3): 112.
- Etaati L. 2017. *Advance Analytics with Power BI and R*. Auckland: RADACAD Systems Limited.
- Fan J.X., Brown B.B., Kowaleski-Jones L., Smith K.R. & Zick C.D. 2007. Household food expenditure patterns: A cluster analysis. *Monthly Labor Review* **130**(4): 38–51.
- Gibson P. 2021. Types of data analysis. <https://chartio.com/learn/data-analytics/types-of-data-analysis/> (9 July 2022).
- Gupta S. What is predictive analytics? Learn 10 essential predictive analytics techniques. <https://www.springboard.com/blog/data-analytics/predictive-analytics-techniques/> (7 August 2020).
- Holliday M. What is diagnostic analytics? How it works and examples. <https://www.netsuite.com/portal/resource/articles/data-warehouse/diagnostic-analytics.shtml> (9 December 2021).
- Johnson R.A. & Wichern D.W. 2007. *Applied Multivariate Statistical Analysis*. 6th Ed. Upper Saddle River, New Jersey: Pearson Prentice Hall.
- Kemp S.E., Hort J. & Hollowood T. 2018. *Descriptive Analysis in Sensory Evaluation*. 1st Ed. New York: John Wiley & Sons, Ltd.
- Koc P. & Yalcin C. 2021. Future of deep learning for cancer diagnosis. In Kose U. & Alzubi J. (eds.). *Deep Learning for Cancer Diagnosis: 227-238*. Singapore: Springer.
- Nassaji H. 2015. Qualitative and descriptive research: Data type versus data analysis. *Language Teaching Research* **19**(2): 129–132.
- Niu T., Chen Y. & Yuan Y. 2020. Measuring urban poverty using multi-source data and a random forest algorithm: A case study in Guangzhou. *Sustainable Cities and Society* **54**: 102014.
- Okori W. & Obua J. 2011. Machine learning classification technique for famine prediction. In *Proceedings of the World Congress on Engineering 2011 (WCE 2011)*, pp. 991–996.
- Punt C. 2003. Household expenditure patterns in South Africa – 1995. *PROVIDE Project Background Paper 2003: 2*. Elsenburg: PROVIDE Project.
- Rawat A.S. An overview of descriptive analysis. <https://www.analyticssteps.com/blogs/overview-descriptive-analysis> (31 March 2021).
- Luque J.P., Young H. & Miller C. 2017. *The Subprime Crisis: Lessons for Business Students*. Singapore: World Scientific Publishing.
- Zhang T. & Yang B. 2017. Box–cox transformation in big data. *Technometrics* **59**(2): 189–201.

Department of Mathematic and Statistic  
Faculty of Applied Science and Technology  
Universiti Tun Hussein Onn Malaysia (UTHM)  
84600 Hub Pendidikan Pagoh  
Johor, MALAYSIA  
E-mail: serahlathan7@gmail.com, asyikinr@uthm.edu.my\*

*Department of Technology and Management  
Faculty of Technology Management and Business  
Universiti Tun Hussein Onn Malaysia (UTHM)  
86400 Batu Pahat  
Johor, MALAYSIA  
E-mail: ammar@uthm.edu.my*

*School of Quantitative Sciences  
Universiti Utara Malaysia (UUM)  
06010 Sintok  
Kedah, MALAYSIA  
E-mail: shairy@uum.edu.my*

Received: 30 April 2023

Accepted: 25 May 2023