ICIC Express Letters
Volume **15**, Number **4**, April **2021**

 ISSN 1881-803X
pp. **397–407**

THE IMPACT OF DIGITAL LITERATION ON SOCIAL AND ECONOMIC FACTORS IN URBAN COMMUNITIES

Wahyu Sardjono[1], Erna Selviyanti[2], Achmad Cholidin[3] and Guntur Salim[4]

[1]Information Systems, Management Department, BINUS Graduate Program – Master of Information Systems Management
Bina Nusantara University
JL. K. H. Syahdan No. 9, Kemanggisan, Palmerah, Jakarta 11480, Indonesia
wahyu.s@binus.ac.id

[2]Health Department
Politeknik Negeri Jember
Jember, Jawa Timur 68124, Indonesia
ernaselviyanti@polije.ac.id

[3]Law Study Program
Faculty of Law
University of Muhammadiyah Jakarta
Jl. K. H. Ahmad Dahlan, Cireundeu, South Tangerang City, Banten 15419, Indonesia
a_cholidin@yahoo.com

[4]Post Graduate Program
Faculty of Economic Science
University of Trisakti
Jln. Kyai Tapa No. 1 Grogol, Jakarta 11440, Indonesia
guntursalim1979@gmail.com

Received September 2020; accepted December 2020

Abstract. *"Making Indonesia 4.0" is the big vision of the Indonesian government. One of them is the need to carry out transformations in technological developments that increase efficiency. Riau Province is one of the provinces with the agricultural and mining sectors as the mainstay of economic growth with an economic growth index of 2.71% and is the province with the lowest economic growth. In accordance with the 2019 Ministry of Industry data, the contribution of the Small and Medium Industry (SMI) in the food sector in Riau Province is very high in supporting the economy. SMI must be able to survive and adapt, with technological advances such as the ability to adopt digital literacy to develop its business. The main objective of this study is to analyze the influence of socio-economic factors (age, education, income) on digital literacy which has a strong socio-economic attachment. The results showed the influence of digital literacy, with the analysis of the coefficient of determination of 83.4% of socioeconomic factors affecting digital literacy.*

Keywords: Digital literacy, Multiple linear regression, Socio-economy, Urban community

1. **Introduction.** Based on the Economic Policy Package XIV, Indonesia needs to increase globally connected economic activity supported by qualified digital literacy, which is called "Making Indonesia 4.0". The digital economy ecosystem in Indonesia is currently growing. According to a media company, We Are Social (Hootsuite), the use of Internet and social media in 2019 in Indonesia has increased significantly (13%) over the previous year. Internet users now number is 150,000,000 [1]. The conditions outlined above make the reason for the digital economy in Indonesia to grow significantly. However, during a

DOI: 10.24507/icicel.15.04.397

digital economy that continues to grow, 3 main challenges need to be overcome together. One of the 3 challenges is the necessity to transform in technological developments that increase efficiency and speed. One of the regions in Indonesia that received admonition from Deputy Governor of BI (Bank of Indonesia) was Riau Province, where the agriculture and mining sectors were still the mainstay of economic growth. This is supported by data of Indonesia's economic growth, which presents Riau Province as an area with an economic growth index of 2.71% which is the province with the lowest economic growth. Meanwhile, other data states that the level of poverty in Riau Province is influenced by rising fuel prices (Badan Pusat Statistik, 2019). The data indicate that Riau Province still depends on conventional economics, while the digital economy is still unable to help improve the economy in Riau Province. Related facts were outlined by the Deputy Governor of BI that the economy of Riau Province still depends on the sectors of agriculture and mining. Therefore, there should be the other source of economic that may sustain the economy of Riau Province. One of the areas of the industry that is quite potential of Riau Province is food industry. It is following the data of the Ministry of Industry of Indonesia in 2019 that the contribution of Small and Medium Industries (SMI) of the food sector in Riau Province is very high in the role of sustaining the economy (Kemenperin.go.id, 2019). Research on digital literacy has been done a lot before. One of them is qualitative digital literacy analysis of art teachers in junior and senior high schools in China. From this study, it was found that environmental factors, especially digital media support, are a prerequisite from the government that can encourage digital literacy in art teachers in China [2]. Also, other study observes digital literacy from 5th and 6th-grade elementary school students. The study was conducted on 796 students in Beijing.

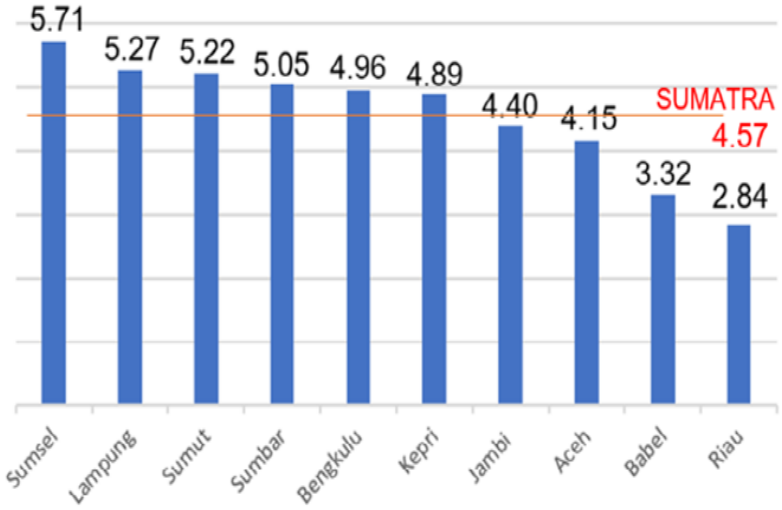

FIGURE 1. Comparison of rate of growth of the PDRB (c-to-c) Province on the island of Sumatra in 2019

From the results of the study it was found that the digital literacy of students was significantly influenced by parental mediation [3]. Apart from the fact that socio-economic is fundamental in people's lives, this factor also actually departs from the understanding of digital literacy described by UNESCO [4], where UNESCO provides an understanding that digital literacy is the ability to use, create or utilize digital technology and networks in managing information in social and economic activities. From this understanding, the socio-economic factor should be the most important factor to be observed with regard to digital literacy [5]. The main purpose of this research focuses on analyzing the influence of socio-economic factors including age, education, and income towards digital literacy due to the strong attachment between socio-economics and digital literacy.

2. Literature Review.

2.1. **Digital literacy.** Digital literacy is defined by the *United Nations Educational, Scientific and Cultural Organization* (UNESCO) as "the capability to define, organize, operate, assess and share information correctly and thoroughly through technology and network devices to participate in economic and social life" (UNESCO, 2018, 6).

The framework for digital literacy has been explained by [6]. She explained that there are four crucial abilities that must be owned by individuals so it can be said to have competence in digital literacy, namely:

1) Internet Searching, Capability in searching information in Internet networks.

2) Hypertext Navigation, The capability of a person in understanding navigation of hypertext.

3) Content Evaluation, Capability in understanding information. Where someone can evaluate the truth of the information.

4) Knowledge Assembly, The capability of a person in creating his own knowledge from information or data that he obtained.

2.2. **Socio-economics.** According to [7], socio-economics has a definition as the position of a person in a society that is indirectly driven by economic activity, education and income. Socio-economics is an important asset because socio-economics will affect many other aspects of life in society, such as cognitive aspect related to morals, affective aspect related to attitudes and conative aspect related to community behavior.

2.3. **Multiple linear regression analysis.** Multiple linear regression is a linear regression model involving more than one independent variable or predictor. In English, this term is called multiple linear regression. In another article, namely in the article explaining the various types of multiple regression, we have explained the difference between multiple regression and simple regression. Basically, multiple linear regression is a prediction or forecasting model using interval or ratio scale data and there is more than one predictor. The data scale referred to above is for all variables, especially the dependent variable. In linear regression, it is possible to use dummy data on the independent variable, namely in linear regression with a dummy [8]. *Multiple linear regression is performed to predict the values of a dependent variable, Y, given a set of explanatory variables p* $(x1, x2, \ldots, xp)$ [9].

2.4. **Urban communities in digital literacy.** Several statements were stated by observers of the development of modern communication which showed humans that information is an important element in a society. Straubhaar stated that the information society is a society which has socio-economic activities through the process of production, consumption and distribution of information. The information society is characterized by a high intensity of exchange and use of communication technology [10]. The information society, in [11], is a society that depends on electronic information and communication networks, and allocates most of its resources for information and communication activities.

3. Methodology.

3.1. **Variables.** Variables can be said as the character of an object that has certain differences that have been determined to be analyzed and made conclusions [12]. This study uses independent variables and dependent variables. Independent variables that are used in this study are several socio-economic factors, including age, education and income [13]. While, the dependent variable of this research is digital literacy.

3.2. **Hypothesis.** The following points are the research hypotheses:

1) Age has negative effect on digital literacy;
2) Education has positive effect on digital literacy;
3) Income has positive influence on digital literacy;
4) Socio-economic factors (age, education, income) simultaneously influence digital literacy.

3.3. **Data collection methods.** Data collection is carried out through questionnaire. The method questionnaire is closed, the answer options have been determined and the respondent has no other answer options. The statements of questionnaire ultimately produce qualitative data. The data is then replaced into a quantitative form with a statistical approach. The observed statements include 25 indicators. With the method of distributing the questionnaire, the data obtained for this research is called "primary data".

3.4. **Analysis method.** Data quality test should be done before processing the core process (analysis). These 2 things are usually called reliability and validity. In this research, data quality test is done by validity testing and reliability testing. Hypothesis testing is a way to make decisions in data analysis whether the hypothesis is rejected or accepted. In the hypothesis test, t-test and f-test were performed. The t-test has the function for determining significant influence of independent variable partially to dependent variable. Decision is taken to see if the value of the significance of SPSS compared with $\alpha = 0.01$. Analysis of the coefficient of determination (R^2) has the function to view the donations presentation of variables in influencing simultaneously at dependent variable [14]. The coefficient of determination ranges from 0 to 1. Each adds one independent variable, then R^2 would also be increased, and this addition occurs for both variables that affect or not the independent variable.

4. Result and Discussion.

4.1. **Validity test.** At this stage, questionnaire tested whether legitimate or not. The test is carried out on each questionnaire statement which amounts to 25 statements. Testing compares r-count with r-table for degree of freedom (df) $= n - 2$ with value of $\alpha = 0.01$, where $n =$ number of samples. The validity of the statement of the questionnaire is if the correlation between each indicator of the total score showed significant results with a significance level of 1%, df $= n - 2(71 - 2) = 69$, r-table 0.3038.

From Table 1, all of Pearson correlations have higher value than r-table, so that all of the research instruments are valid.

4.2. **Reliability test.** At this stage, the consistency of the measuring tool is seen when it is used repeatedly. The reliability test uses the Cronbach alpha technique which influences how far a measuring tool can be relied upon. This means, it is showing that the measurement results remain consistent when measured 2 times or more on the same object and measuring instrument. Testing is done by SPSS version 25.0 for windows using the Cronbach alpha technique with the following criteria:

a) Cronbach alpha value > 0.6 is reliable;
b) Cronbach alpha value < 0.6 is not reliable.

Based on Table 2, the Cronbach alpha value is 0.946, so that it can be concluded that all research instruments are reliable.

4.3. **Classical assumption test.**

4.3.1. *Normality test.* At this stage, confounding/residual variables have normal distribution. Determination of residual normality is done by paying attention to Figure 2.

Table 1. Summary of validity test results

Variable	Question item	Pearson correlation	r-table	Status
Digital literacy (Y)	Y1	0.665	0.3038	VALID
	Y2	0.597	0.3038	VALID
	Y3	0.418	0.3038	VALID
	Y4	0.655	0.3038	VALID
	Y5	0.487	0.3038	VALID
	Y6	0.556	0.3038	VALID
	Y7	0.511	0.3038	VALID
	Y8	0.807	0.3038	VALID
	Y9	0.693	0.3038	VALID
	Y10	0.536	0.3038	VALID
	Y11	0.368	0.3038	VALID
	Y12	0.791	0.3038	VALID
	Y13	0.802	0.3038	VALID
	Y14	0.670	0.3038	VALID
	Y15	0.683	0.3038	VALID
	Y16	0.727	0.3038	VALID
	Y17	0.680	0.3038	VALID
	Y18	0.643	0.3038	VALID
	Y19	0.694	0.3038	VALID
	Y20	0.802	0.3038	VALID
	Y21	0.813	0.3038	VALID
	Y22	0.844	0.3038	VALID
	Y23	0.794	0.3038	VALID
	Y24	0.762	0.3038	VALID
	Y25	0.729	0.3038	VALID

Table 2. Reliability test

Variable	Cronbach alpha	Number of questions
Digital literacy (Y)	0.946	25

Through image, it can be noticed that the data is spread around a diagonal line (not scattered from the line). It can be deduced that requisite test for normality is met for the statistic test of t-test and R^2 test that can be carried out in this study to test the hypothesis.

It is also reinforced by the statistical normality test using Kolmogorov-Smirnov test that may be noted from Table 3.

Based on Table 3, it can be seen Kolmogorov-Smirnov residual significance test is 0.200, so that the residual normality assumption is fulfilled. Based on these conditions, the conclusion is that the regression model is free of multicollinearity.

4.3.2. *Heteroscedasticity test.* Heteroscedasticity testing is done by observing the scatter plot patterns of the results of SPSS data processing. If scatter plots build a pattern, then there is heteroscedasticity. The existence of heteroscedasticity implies that estimators in the model are inefficient in both large and small samples.

Based on Figure 3, scatter plot that is obtained does not create a pattern in the two regression models, which means that the regression model does not have symptoms of heteroscedasticity.

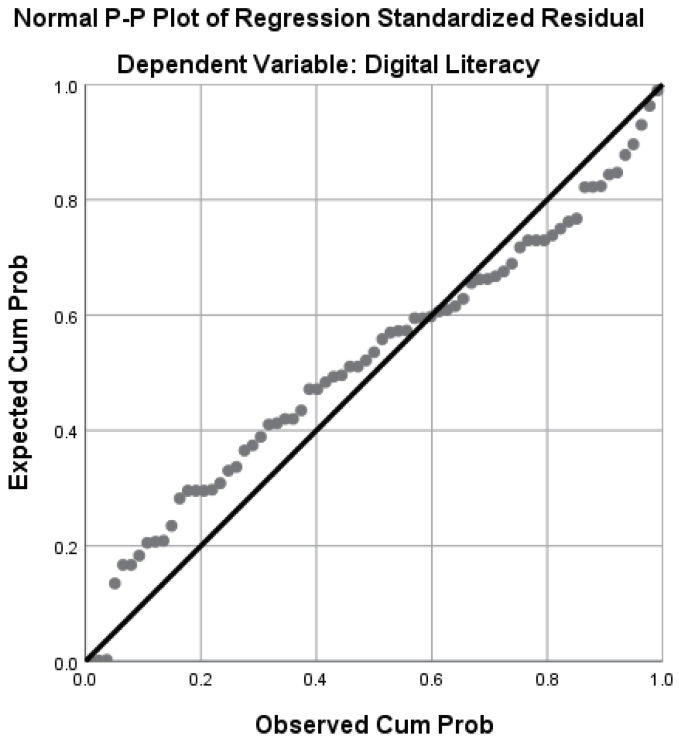

FIGURE 2. Normal probability standardized residual

TABLE 3. Data normality test results with the Kolmogorov-Smirnov test

		Unstandarized residual
N		71
Normal parameter	Mean	.0000000
	Std. Deviation	.25178848
Most extreme differences	Absolute	.123
	Positive	.087
	Negative	−.123
Test statistic		.123
Asymp. Sig. (2-tailed)		.200

TABLE 4. Multicollinearity test results

Coefficients				
Model		Collinearity statistic		Conclusion
		Tolerance	VIF	
1	(Constant)			
	Age	0.917	1.091	Multicollinearity free
	Education	0.591	1.691	Multicollinearity free
	Income	0.573	1.745	Multicollinearity free

4.3.3. *Autocorrelation test.* Whether or not there is a correlation between confounding errors in period t and errors of disturbers in period $t-1$ is tested by autocorrelation test. The presence of autocorrelation was detected by the Durbin-Watson test (DW test). If the value of the Durbin-Watson is between -2 to $+2$, then there is no autocorrelation.

Based on Table 5, it can be noted with number of samples (n) as many as 71 and the number variable independent (k) as many as 3 then obtained DU value of 1.546. By

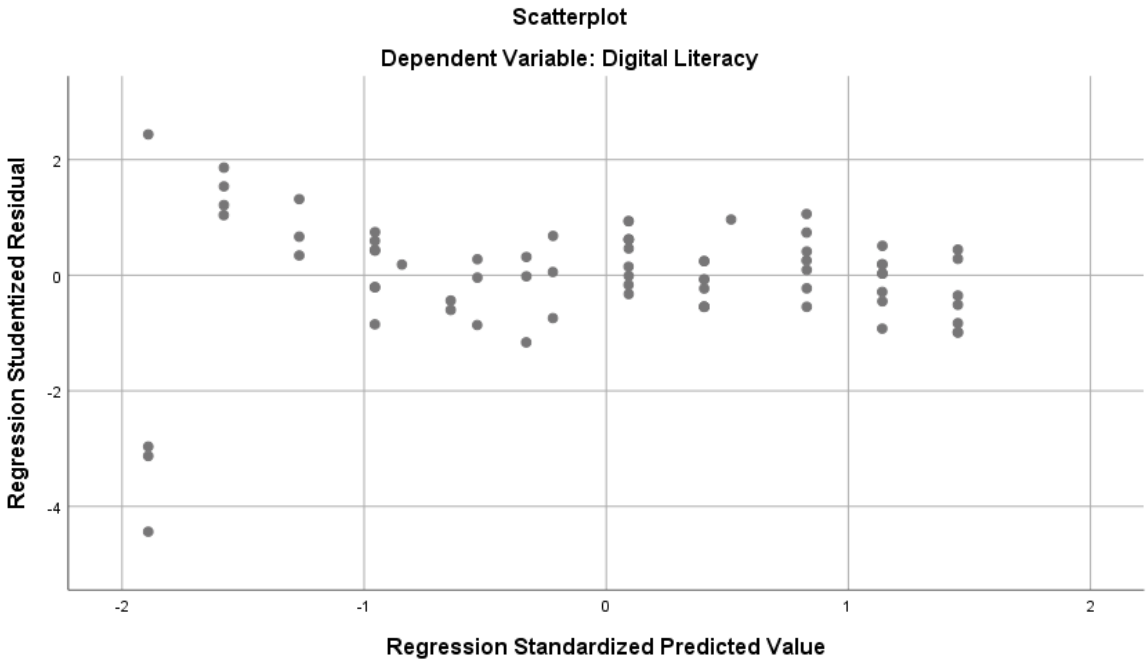

FIGURE 3. Heteroscedasticity test results

TABLE 5. Durbin-Watson statistics model summary[b]

Model	R	R-square	Adjusted R-square	Std. error of estimate	Durbin-Watson
1	.913[a]	.834	.826	.25736	2.063

a. Predictors: (Constant), income, age, education

b. Dependent variable: Digital literacy

entering DU and DW values to formulation "DU < DW < 4 − DU", the formulation will become 1.546 < 2.063 < 2.45.

4.4. **Multiple regression analysis.** The analysis process was carried out using the SPSS application. The analysis was carried out by adopting one method in statistics, namely multiple linear regression using internal factors and external factors, as shown in Table 6.

TABLE 6. Multiple linear regression test and t-test

Model		Unstandarized coefficient		Standarized coefficient	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.941	.134		21.918	.000
	Age	−.176	.047	−.195	−3.752	.000
	Education	.176	.030	.379	5.839	.000
	Income	.414	.050	.544	8.264	.000

Equation Formed:

PIA = 2.941 − 0.176U + 0.176PDD + 0.414PDP + e

- α = Constant value is 2.941, indicating if the independent variables namely age, education, and income are zero or assumed to be constant, then digital literacy is a constant of 2.941.

- $\beta 1$ = Value beta age negative value 0.176 means that if there is a rise age 1%, it will decrease the digital literacy as much as 0.176.
- $\beta 2$ = Education beta value is positive 0.176 means that if there is an increase of 1% it will increase digital literacy by 0.176.
- $\beta 3$ = Beta value of income is positive 0.414 means that if there is an increase of 1% it will increase digital literacy by 0.414.
- e = Is a random variable. the standard error (e) represents all factors that have an effect on Y but are not included in the equation.

Based on Table 7, obtain the level of significance (F-Statistic Prob) of 0.000, where 0.000 is less than the value of 0.01 significance level.

TABLE 7. F test ANOVA

Model		**Sum of square**	**df**	**Mean square**	**F**	**Sig.**
1	Regression	22.220	3	7.407	111.820	0.000
	Residual	4.438	67	0.066		
	Total	26.657	70			

4.5. **Analysis of results.**

4.5.1. *First hypothesis analysis (H1).* Following are the test results of the first hypothesis and its discussion.

TABLE 8. Testing results of H1

Variable	**t-count**		**t-table**	**Sig.**		$\boldsymbol{\alpha}$	**Status**
Age	-3.752	$<$	-2.651	0.000	$<$	0.01	**Take effect**

It can be seen in Table 8, t-count < t-table that is $-3.752 < -2.651$, the significance value of $0.000 < 0.01$. So, the decision can be taken. So here there is significant influence negatively of age on digital literacy with significance value of 0.000 and the error rate (α) of 0.01. According to the Indonesian Ministry of Health, age can be grouped into toddlers (age: 0-5), children (age: 5-11), adolescents (age: 12-25), adults (age: 26-45), elderly (age: 46-65) and seniors (age: > 65). In the elderly age group, a study by [15] has described that the elderly people experience a reversible reduction in cognitive abilities or memory that occurs due to aging and progressive degenerative changes. This reinforces the current study in which when a person turns old, their brain's ability to capture digital science decreases, which in turn affects digital literacy. This is in line with a study in the Sage Journal, which explains that the ability of the brain is optimal in processing and remembering when humans are 18 years old. This study was conducted by asking questions to thousands of people who have ages 8 to 85 years.

4.5.2. *Analysis of second hypothesis (H2).* Following are the testing results for the second hypothesis and its discussion.

TABLE 9. Testing results of H2

Variable	**t-count**		**t-table**	**Sig.**		$\boldsymbol{\alpha}$	**Status**
Education	5.839	$>$	2.651	0.000	$<$	0.01	**Take effect**

It can be seen in Table 9, t-count > t-table that is $5.839 > 2.651$ with a significance value of $0.000 < 0.01$. Based on the results obtained, it can be understood that the influence that occurs between education and digital literacy is positive, or directly proportional.

This is in line with the initial hypothesis that has been built where education has a positive influence on digital literacy. This is in line with research, which explains that the capability and expertise of business owners is strongly influenced by the level of education they have. Education can change a person's attitude and mindset through learning and practice. The higher the level of education, the things related to understanding the concept will be more trained. Those who have high education, tend to be easier to understand and analyze things. Education can also shape the character and knowledge of a person. With an increasingly high level of education, it will be easier for someone to be able for capturing and exploiting digital technology properly.

4.5.3. *Third hypothesis analysis (H3).* Following are the test results for the third hypothesis and its discussion.

Table 10. Testing results of H3

Variable	**t-count**		**t-table**	**Sig.**		α	**Status**
Income	8.264	$>$	2.651	0.000	$<$	0.01	**Take effect**

Through Table 10 it can be seen that the value of t-count > t-table is $8.264 > 2.651$ with a significance of $0.000 < 0.01$. Therefore, there is a significant effect between income on digital literacy, where the significance value is 0.000 and the error rate (α) is 0.01. Based on the results obtained, influence between income and digital literacy is positive, or proportional. This is in line with the initial hypothesis that has been built where income has a positive influence on digital literacy. Where the more a person earns, the better his digital literacy will be. Various digital media today have become human needs. Especially for those who have a good financial level, it will make them familiar with digital media. Moreover, for those who intentionally deepen digital science to be able to build their own digital systems at a high enough cost, for those who pursue this, surely the level of digital literacy owned will be even better.

4.6. **Analysis the coefficient of determination (R^2).** The coefficient of determination (R^2) is used to calculate the ability of some models in explaining the variation of independent variables. R^2 is valued from 0 to 1. R^2 with a small value means the capabilities of the independent variables are limited.

Table 11. Testing coefficient of determination result (R^2) – Model summary[b]

Model	**R**	**R-square**	**Adjusted R-square**	**Std. error of estimate**	**Durbin-Watson**
1	.913[a]	.834	.826	.25736	2.063

a. Predictors: (Constant), income, age, education

b. Dependent variable: Digital literacy

In accordance with Table 11, obtain value of R 0.931 or 93.1% and R Square (R^2) 0.834 or 83.4%. It gives explanation that 83.4% of digital literacy is influenced by (age, education and income), and then 16.6% is influenced by other variables. From these percentages, it can be concluded that there are other individual factors/variables by 16.6%, which could affect the digital literacy.

5. **Conclusion.** This study intends to determine the effect of age, education and income on digital literacy of the owners of SMI in Pekanbaru. The total sample in this study was 71 SMI owners. Here are the results of the analysis obtained.

Based on a partial test (t-test), the following results have been obtained.

a) Age has a significant negative effect on digital literacy. It means that if age gets higher, the ability of digital literacy will be lower. This is in line with the hypothesis that the writer had formed that age has the negative effect on digital literacy. This is analyzed as a result of reversible cognitive impairment or memory that occurs when a person experiences an aging process and progressive degenerative changes. Where when a person turns old, then their brain's ability to capture digital science will decrease which will ultimately affect the ability to use digital information and use digital devices. This is in line with a previous study that explained that the optimal brain's ability to process and remember is when humans are 18 years old.
b) Education has a significant effect on digital literacy, with a positive direction. The higher the level of someone's education is, the better digital literacy they have. This is in line with the hypothesis that has been built where education has a positive influence on digital literacy. This happens because business owners with low levels of education tend not to be able to utilize digital information better than owners who have higher formal education. Education is considered capable of changing one's mindset through learning efforts.
c) Income has a significant effect on digital literacy, with a positive direction. The higher the level of someone's income is, the better digital literacy they have. This is in line with the hypothesis that income has a positive effect on digital literacy. This condition shows that the higher a person's income, he will have financial freedom to access and explore various digital devices. Digital literacy is something that requires good financial capability as well to be able to understand it, and it can be understood where digital literacy will not be separated from the access and use of digital devices.
d) Further research can be developed using technology as the implementation of the industrial revolution 4.0 in the field of digital literacy for competitive advantage and sustainable development for society.

REFERENCES

[1] I. A. Jumaan, N. H. Hashim and B. M. Al-Ghazali, The role of cognitive absorption in predicting mobile Internet users continuance intention: An extension of the expectation-confirmation model, *Technology in Society*, vol.63, 2020.
[2] P. Phuapan, C. Viriyavejakul and P. Pimdee, An analysis of digital literacy skills among Thai university seniors, *International Journal of Emerging Technologies in Learning*, vol.16, no.3, 2016.
[3] H. Zhang and C. Zhu, A study of digital media literacy of the 5th and 6th grade primary students in Beijing, *Asia-Pacific Education Researcher*, vol.25, no.4, pp.579-592, 2016.
[4] A. Anderson and B. Johnston, UNESCO contributions to information literacy, *From Information Literacy to Social Epistemology*, pp.115-128, 2016.
[5] W. Techataweewan and U. Prasertsin, Development of digital literacy indicators for Thai undergraduate students using mixed method research, *Kasetsart Journal of Social Sciences*, vol.39, no.2, pp.215-221, 2018.
[6] Q. Q. A'yuni, Adolescent digital literacy in Surabaya City (Descriptive study of digital literacy competency levels in junior high school, high school and college students in Surabaya City), *Libri-Net*, vol.4, no.2, 2015.
[7] W. Astrawan, I. Nuridja and I. Dunia, Socio-economic analysis of C digging miners in Sebudi Village, Selat District, Karangasem Regency, *Journal of Economic Education*, vol.4, no.1, 2014.
[8] G. K. Uyanık and N. Güler, A study on multiple linear regression analysis, *Procedia – Social and Behavioral Sciences*, no.106, pp.234-240, 2016.
[9] G. Grégoire, Multiple linear regression, *EAS Publications Series*, vol.66, pp.45-72, 2015.
[10] M. Gulbe, Quantitative characteristics of information society and ICT industry in Latvia, *Procedia Economics and Finance*, vol.26, pp.682-687, 2015.
[11] A. O. Karpov, The problem of separating the notions of "knowledge" and "information" in the knowledge society and its education, *Procedia – Social and Behavioral Sciences*, vol.237, pp.804-810, 2017.

[12] W. Sardjono, E. Selviyanti and W. G. Perdana, The application of the factor analysis method to determine the performance of IT implementation in companies based on the IT balanced scorecard measurement method, *Journal of Physics: Conference Series*, East Java, Indonesia, vol.1538, 2019.
[13] W. Sardjono and F. Firdaus, Readiness model of knowledge management systems implementation at the higher education, *ICIC Express Letters*, vol.14, no.5, pp.477-487, 2020.
[14] W. Sardjono, B. S. Laksmono and E. Yuniastuti, The social welfare factors of public transportation drivers with online application as a result of the 4.0 industrial revolution in transportation, *ICIC Express Letters*, vol.14, no.4, pp.361-368, 2020.
[15] A. Daste, C. Chakiba and P. Soubeyran, Targeted therapy and elderly people: A review, *European Journal of Cancer*, vol.69, pp.199-215, 2016.