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DEMOGRAPHIC AND SOCIOECONOMIC CHARACTERISTICS OF E-COMMERCE USERS IN INDONESIA

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Abstract

Nowadays, it is very important to capture the data relating to the e-commerce phenomenon. It is related to the use of information and communication technology (ICT), not only in the ICT sector, but in all sectors. ICT can accelerate the development of economies, which, in turn, impacts social economic life. That is why ICT can be a catalyst for the Sustainable Development Goals. However, a standard methodology has not yet been developed to capture data relating to the e-commerce phenomenon and even BPS-Statistics Indonesia has not been able to fully capture it. However, BPS-Statistics Indonesia has produced the National Socio-Economic Survey (Susenas) which asked people about their purposes for accessing the internet, and one of the choices they were given was to receive and/or place orders of goods/services. The analysis includes 34 provinces in Indonesia in 2015. In addition, a log linear model was used to analyze the tendency of individuals conducting e-commerce transactions in Indonesia, which will be seen through a lens of demographic and socioeconomic characteristics. The odds ratio indicates that women have a higher tendency than men for conducting e-commerce transactions. In addition, the tendency of individuals aged 25 to 64 years old is higher than for other age groups. The study also shows that individuals who work in the services sector have a higher tendency than those who work in other sectors. Finally, well-educated individuals have a lower tendency toward conducting e-commerce transactions than less-educated individuals.

Keywords: e-commerce, ICT, demographic, socioeconomic

JEL Classification: R20, R22, R29, L81, D12

Contents

1. INTRODUCTION

Indonesia has recently been dealing with a slowdown of economic growth; however, it is estimated that e-commerce transactions have been increasing, which is in line with the increase in penetration of the internet. Internet users in Indonesia increase year by year; in 2014 there were only 17.14% of individuals using the internet in Indonesia, which rose to 21.98% in 2015 (Statistics Indonesia 2015). Indonesia was the eighth largest internet user in the world in 2015 (Internet World Statistics), and Internet Live Stats have estimated that Indonesia will have the twelfth largest group of internet users in 2016. However, internet penetration in Indonesia is still low; of its approximate population of 250 million, only about 22 out of 100 inhabitants have access to the internet.

Its low position for internet penetration suggests that Indonesia has a potential market for e-commerce in Asia in addition to the People's Republic of China. The Indonesia E-commerce Association (IdEA) has stated that the market share of e-commerce is still below 1% of the online retail market share (SINDO 2015). There is still room for growth of e-commerce in Indonesia; in fact, e-commerce start-ups are making more of an appearance in the market. In line with the growth of e-commerce in Indonesia, nowadays, it is very important to capture the data relating to the e-commerce phenomenon. E-commerce is related to the use of ICT, and it not only impacts the ICT sector, but also on all sectors.

ICT can accelerate the development of economics, which in turn, impacts social economic life, making it a potential catalyst for the Sustainable Development Goals (SDGs). Houlin Zhao, secretary general of the International Telecommunication Union (ITU) wrote an article called "Creating an inclusive digital economy is vital to achieving the SDGs" (Houlin Zhao quoted in Pak, Vaena, and Wilson 2016). E-commerce has a profound impact on economic efficiency, competitiveness, and profitability and the result is that it will impact the development of an information society (Singh 2002). E-commerce also can impact productivity and inflation (Willis 2004), because there is a reduction in costs when doing transactions, greater competition, cost savings, and changes in price-setting behavior of sellers (Willis 2004). E-commerce is associated with productivity improvements that have also been stated by UNECLAC (2002), who noted that internet and e-commerce are transforming the way firms operate by redefining how back-end operations—product design and development, procurement, production, inventory, distribution, after-sales service support, and even marketing—are conducted. Moreover, UNECLAC (2002) stated that the end results include efficiency improvements, better asset utilization, faster time to market, reduction in order fulfillment times, and enhanced customer service. Research of Hanne Melin from eBay's Public Policy Lab proved that e-commerce can be a powerful export enabler for small businesses in advanced and developing countries (Staechelin quoted in Pak, Vaena, and Wilson 2015).

However, there has not yet been a standard methodology developed to capture the data for the e-commerce phenomenon; BPS-Statistics Indonesia has not even been able to fully capture it. However, BPS-Statistics Indonesia has published the National Socio-Economic Survey (Susenas) which asked people for the reasons they access the internet, and one of the choices they could make is to receive and/or place orders of goods/services. In order to capture the data relating to e-commerce, Prastiwi et al. (2014) suggested the use of the Integrated Business Register of Indonesia (now it is known as Statistical Business Register).

Nowadays, internet access in the business sector is very closely related to receiving orders and placing orders of goods/services, namely e-commerce transactions. This paper is the first in Indonesia to describe the demographic and socioeconomic characteristics of e-commerce users based on Susenas data. The question about e-commerce first appeared in the 2015 Susenas questionnaire, which was designed by BPS-Statistics Indonesia, particularly in the question regarding the purpose of using the internet. This paper shows the tendencies of individuals to conduct e-commerce transactions in Indonesia based on their demographic and socioeconomic characteristics.

Several studies have been conducted in order to analyze the behavior or attitude of e-commerce users. Chiu et al. (2005) proposes a model of online purchase intentions by using four exogenous constructs, namely, personal awareness of security, personal innovativeness, perceived ease of purchasing, and perceived usefulness. These constructs not only have a direct influence on attitudes and online purchase intentions, but also have indirect influences on online purchase intentions through the mediation of attitudes. The study of Chiu et al. (2005) found that males and females have similar influences of personal innovativeness and perceived usefulness on attitudes and are similar in relation to their online purchase intentions. However, several studies have shown that males are more likely to conduct e-commerce transactions than females. This might be due to the different types of products bought by males and females. Some studies found that gender, age, and education have a positive relationship to e-commerce. The higher a person's income, education, and age, the more likely that person will be to make online purchases, and additionally, a higher income leads to more online transactions (Bellman, Lohse, and Johnson 1999).

It is important to have information about the attitudes of e-commerce users in Indonesia in order to improve the market potential. There is no significant difference in attitude toward online shopping among age and occupation groups, according to the study of Jusoh and Ling (2012). Instead, gender, marital status, residential location, age, education, and household income are more important predictors of internet purchasing for internet buyers (Fram and Grady 1997; Kunz 1997; Mehta and Sivadas 1995; Sultan and Henrichs 2000 quoted in Richa 2012). Owens and Sarov (2010) determined the various degrees of influence socioeconomic and internet-related factors have on American consumer's attitudes toward online shopping. The results suggest that demographic characteristics such as age, gender, and race, as well as an individual's income, education, and frequency of internet usage affect one's willingness to shop online (Owens and Sarov 2010). In India, the study of Dahiya Richa (2012) on the impact of demographic factors of consumers on online shopping parameters showed that age, gender, marital status, family size, and income significantly affect online shopping in India. By using logistics regression, Bigne, Ruiz, and Sanz (2005) have shown that age, social class, and experience of internet shopping are the variables that best predict mobile commerce or M-commerce behavior. Moreover, the study of Rezai et al. (2013) showed that demographic variables such as age, gender, education level, income, and ethnicity have a significant effect on the purchasing of herbal products online in Malaysia. Bijou Yang and David Lester (2005) compared the predictors of shopping online between men and women by using OLS and MLE (logit and probit) regression techniques. Women tend to be affected by more factors than men; this gender difference in online shopping could be due to preferences for shopping styles or attitudes toward computers and the internet (Yang and Lester 2005 quoted in Akman and Rehan 2010). In one study, marital status only had a significant effect on the purchasing of hardware among 17 product categories (Bhatnagar, Misra, and Rao 2000). Online shoppers are not necessarily more educated, which can be explained by the fact that online shopping is a relatively easy task (Zhou, Dai, and Zhang 2007). In

Zhou, Dai, and Zhang (2007), some studies identified a positive relationship between education and the time and money consumers spent online (Li et al. 1999; Liao and Cheung 2001; Susskind 2004), while others did not (Bagchi and Mahmood 2004; Bellman et al. 1999; Donthu and Garcia 1999; Mahmood et al. 2004). The impact of e-commerce on trade in services is also significant, as noted by Terzia (2011), the most relevant change in trade in services is e-commerce's and information technology's ability to make non-tradable services (i.e., research and development, computing, inventory management, quality control, accounting, personnel management, marketing, advertising, and distribution) into tradable ones.

In general, this paper aims to analyze the differences among e-commerce users based on their demographic and socioeconomic characteristics (gender, age groups, educational attainment, and working sector). The focus of this paper is on individuals who receive or place orders of goods or services within Indonesia, rather than by cross-border e-commerce. The first section of this paper outlines the descriptive analysis of individuals who receive or place orders of goods/services. Then the tendency of individuals toward conducting e-commerce transactions is analyzed using a log linear model based on their demographic and socioeconomic characteristics. Furthermore, in order to know whether demographic and socioeconomic characteristics can be determinants of individuals to conduct e-commerce transactions, this study also utilizes a probit regression model.

2. DATA

The 2015 National Socio-Economic Survey (Susenas) was carried out in all Indonesia's provinces (34 provinces) with a sample size of 300,000 households in 511 districts/municipalities, excluding households that belong to a specific census block and specific households such as orphanages, residence halls, dormitories, hotels, prisons, military barracks, and other similar households if they are located in an ordinary block census (Statistics Indonesia 2015). In the 2015 Susenas questionnaire, there is a special section about information and communication technology (ICT). In this ICT block, there are questions about individuals using the internet in the last 3 months and their purpose for accessing the internet. One of the purposes of accessing the internet offered in the questionnaire was to receive and/or place orders of goods and/or services.

In order to analyze the data based on demographic and socioeconomic characteristics, some variables from Susenas were categorized into two or more categories, depending on the variables used. Coding for gender variables are 1 for male and 2 for female. Age was categorized into four groups, less than 18 years old, 18 to 24 years old, 25 to 64 years old, and more than 64 years old. Educational attainment was categorized into five groups (not attending school, elementary school, junior high school, senior high school, bachelor degree, and master/doctoral degree). The working sectors were categorized as: individuals who work in other sectors; agriculture; mining and quarrying; manufacturing industry; electricity and gas; construction; trade, hotel, and restaurant; transportation, storage, information, and communication; finance and insurance; services. In addition to descriptive analysis, marital status, relationship to head of household, and expenditures were also used in this paper.

Table 1: Category of Variables

Variable	Category in Susenas	New Category
(1)	(2)	(3)
Gender	1. Male 2. Female	1. Male 2. Female
Age	–	1. <18 years old 2. 18–24 years old 3. 25–64 years old 4. >64 years old
Educational attainment	1. Doesn't have primary school certificate 2. Package A 3. Primary/MI/SDLB 4. Package B 5. Junior secondary/MTs/SMPLB 6. Package C 7. Senior secondary/MA/SMLB 8. SMK/MAK 9. Diploma 1/2 10. Diploma 3 11. Diploma 4/S1 12. S2 13. S3	1. Not attending school 2. Elementary school 3. Junior high school 4. Senior high school 5. Bachelor degree 6. Master/doctoral degree
Working sector	0. Other sectors 1. Agriculture 2. Mining and quarrying 3. Manufacturing industry 4. Electricity and gas 5. Construction 6. Trade, hotel, and restaurant 7. Transportation, storage, information, and communication 8. Finance and insurance 9. Services	0. Other sectors 1. Agriculture 2. Mining and quarrying 3. Manufacturing industry 4. Electricity and gas 5. Construction 6. Trade, hotel, and restaurant 7. Transportation, storage, information, and communication 8. Finance and insurance 9. Services
Marital status	1. Single 2. Married 3. Divorced 4. Widowed	1. Single 2. Married 3. Divorced 4. Widowed
Relationship with the head of household	1. Head of household 2. Wife/husband 3. Biological/step-child 4. Foster child 5. Child-in-law 6. Grandchild 7. Parents/in-law 8. Servant 9. Others (other person/no relation to the head of household)	1. Head of household 2. Wife/husband 3. Biological/step-child, foster child, child-in-law, grandchild 4. Parents/in-law 5. Servant 6. Others (other person/no relation to the head of household)

Source: Statistics Indonesia and Author.

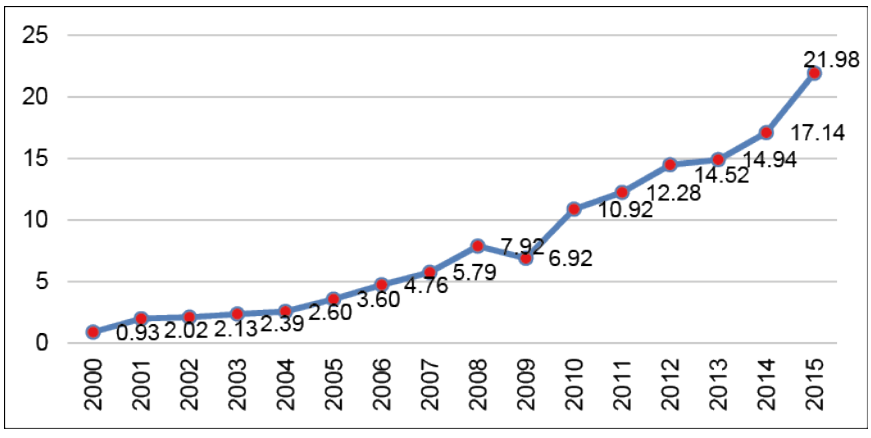
2.1 E-Commerce

In the OECD publication, OECD Guide to Measuring the Information Society 2011, it is the method by which the order is placed or received, not the payment or channel of delivery, which determines whether the transaction is an e-commerce transaction. The narrow definition of e-commerce transactions refers to those conducted over the internet, while the broad definition refers to all computer-mediated networks (OECD 2011). E-commerce users were calculated using the number of individuals in Indonesia who use the internet to receive and/or place orders of goods and/or services. An E-commerce user in this paper means an individual who receives and/or places orders of goods and/or services via the internet. B2B, B2C, C2C, and B2G are several types of e-commerce (UNCTAD 2015). In this study, a user can refer either to a business or a consumer and it can be classified into B2C or C2C. Users refer to businesses if an individual receives an order of goods/services, while users refer to consumers if an individual places an order for goods/services.

2.2 Data Description

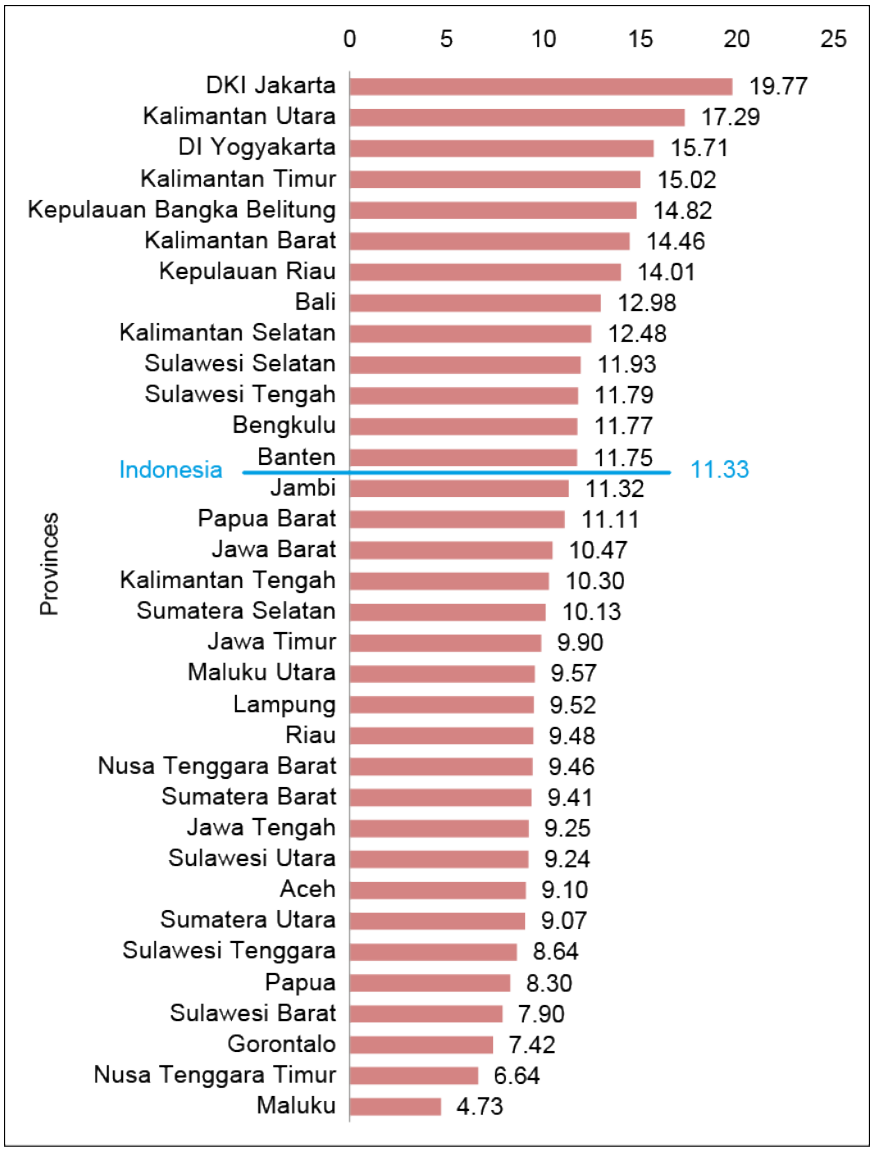
The percentage of individuals using the internet in Indonesia can be seen in Figure 1. Figure 1 shows that percentage of individuals using the internet in Indonesia has been increasing year by year from 2000 to 2015. In 2010 and 2015, the percentage of individuals using the internet increased sharply from the previous year. In 2009, individuals using the internet decreased to 6.92% from 7.92% in 2008. As one of the indicators in Sustainable Development Goals (SDGs), the figure shows an optimistic outlook for enhancing the percentage of internet users in Indonesia. In order to increase this number, it is not only infrastructure such as fiber optic and bandwidth that is required, but also people with ICT skills who can contribute to the Indonesian economy. One of the contributions of people with ICT skills to the Indonesian economy is the rapid growth of e-commerce transactions in Indonesia, which depends on people having internet access.

Figure 1: Internet Users in Indonesia 2000–2015
(%)



Source: International Telecommunication Union. https://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx

Figure 2: Individuals Receiving/Placing Orders of Goods/Services via the Internet
(%)



Source: ICT Statistics Division, Processed from the 2015 National Socio-Economic Survey.

Based on the National Socio-Economic Survey, of all the internet users in Indonesia in 2015, 11.33% received or placed orders for goods or services. The area with the highest number of e-commerce users at a provincial level was DKI Jakarta (19.77%), while the lowest number of e-commerce users at a provincial level was Maluku (4.73%). This percentage of e-commerce users indicates that Indonesia still has a large, potential market for e-commerce. The market of e-commerce in Indonesia can be enlarged especially in the middle and eastern parts of the country due to the small percentage of e-commerce users in these areas. It is notable as well that this percentage of e-commerce users was in line with general internet penetration in Indonesia. The majority of online businesses in Indonesia are in DKI Jakarta, so the delivery costs are cheaper there than in the other provinces of Indonesia. A cheaper cost of delivery influences individuals to place orders of goods or services. The research of Okholm et al. (2013) reveals that the most important aspects of delivery for e-shoppers are low delivery prices, delivery to a home address, access to electronic

delivery notifications, track and trace ability, and convenient return options. The existence of online transportation in a big city like Jakarta also makes the delivery of goods easier. Online transportation also exists in some cities in Jawa Barat and Banten provinces, especially in the cities that are located near Jakarta. Online transportation refers to public transportation which passengers can order through online application and drivers also can receive online on their mobile phone.

3. CHARACTERISTICS OF E-COMMERCE USERS IN INDONESIA

The analysis includes 34 provinces in Indonesia from the year 2015. The variables used are internet access and e-commerce by demographic and socioeconomic characteristics; all variables were calculated based on the National Socio-Economic Survey (Susenas). Descriptive analysis was used to analyze the characteristics of e-commerce in households in Indonesia in 2015. In addition, a log linear model was used to analyze the tendencies of individuals who conduct e-commerce transactions in Indonesia, which will be seen through demographic and socioeconomic characteristics. For further analysis, a probit regression model was obtained.

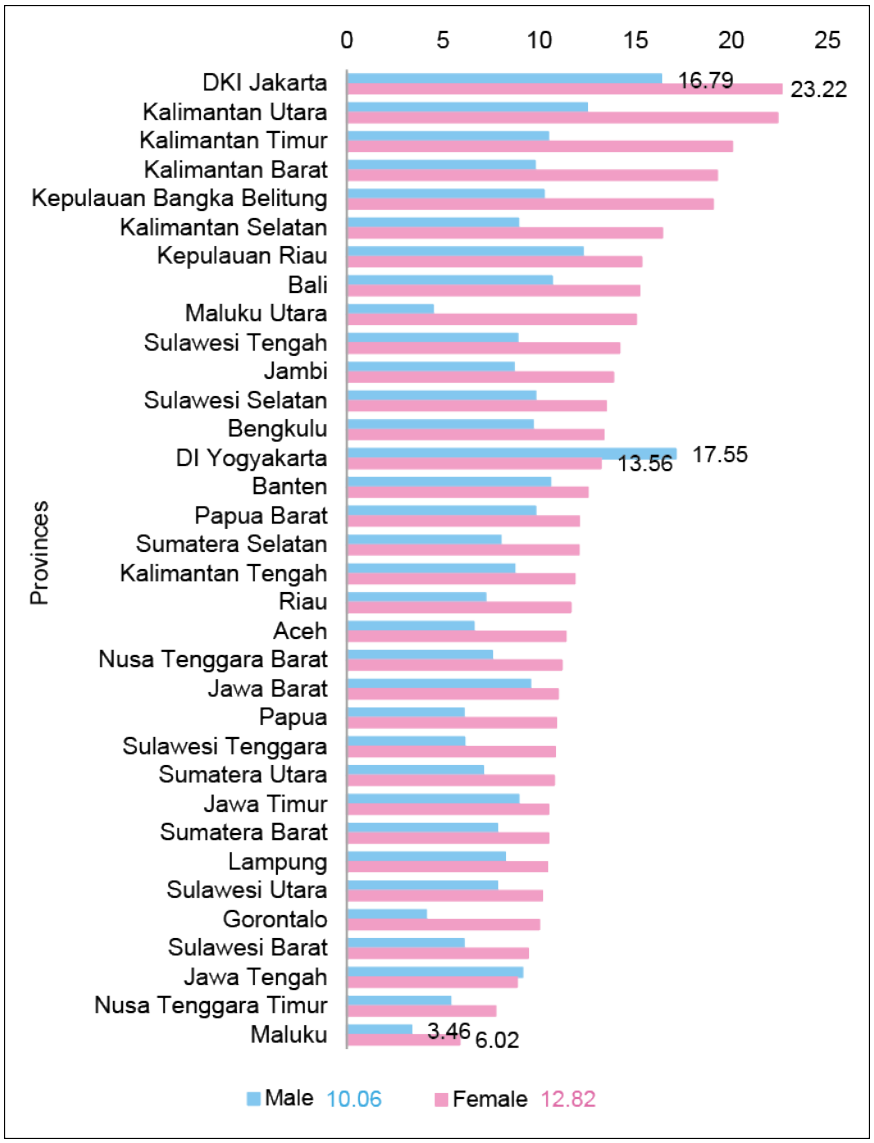
Some of the ways to develop Indonesia's digital economy policies include inducing greater participation of SMEs, developing an e-commerce road map, creating FDI friendly policies, providing greater access to funding for SMEs and start-ups, providing attractive and easier exit strategies, and implementing pro-innovation policies (Ministry of Communication and Information Technology quoted in Wirjoatmodjo 2016). The Government of Indonesia announced the launching of its 14th economic policy package on 10 November 2016. Under the Coordinating Economic Affairs Ministry as well as the Ministry of Communication and Information Technology, this 14th economic policy package focuses on providing incentives for e-commerce and creative industries to support this sector, which offers significant opportunities for Indonesia's youthful and tech-savvy population (GBG Indonesia 2016). This package, which is also known as a road map for e-commerce, aims to support the development of Indonesia as digitally focused economy. Furthermore, as Indonesia's e-commerce sector is set to reach $130 billion in transactions by 2020, consumer protection and cyber security are also being addressed (GBG Indonesia 2016).

In general, e-commerce users in Indonesia are predominantly female in all provinces except DI Yogyakarta. In Indonesia, 12.82% of women received or placed orders of goods/services compared with 10.06% of men. Female e-commerce users in DKI Jakarta, Kalimantan Timur, and Kalimantan Utara numbered more than 20%. In contrast, the percentage of men e-commerce users in DI Yogyakarta was higher than for women. This could be due to preferences for shopping styles or attitudes toward computers and the internet; because of these preferences women tend to be affected by more factors than men (Yang and Lester 2005 quoted in Akman and Rehan 2010).

The variation for males in all provinces was 9.14, which was less than the variation for female e-commerce users in all provinces (16.23). The variation shows that the percentage of females receiving/placing orders of goods/services was more heterogeneous than the percentage of males. The graphic below also shows that the lowest percentage of female e-commerce users was in the eastern part of Indonesia. However, three out of 10 of the lowest percentage of female e-commerce users in Indonesia were in big provinces and located in the western part of Indonesia, including in Jawa Tengah, Sumatera Barat, and Sumatera Utara. While the smallest gap was in Jawa Tengah, the largest gap between males and females who conducted

e-commerce transactions were in Maluku Utara and Kalimantan Utara, which had more than a 10% gap. Gender equality is included in SDGs' goal, especially for ICTs becoming a catalyst to achieve SDGs. ITU and UN Women (2016) stated that increasing women's and girl's access, skills and leadership opportunities in ICTs has enormous potential for improving their health and empowering them through access to information, education, and commercial opportunities, strengthening families, communities, national economies–and ultimately the global society as a whole.

Figure 3: E-Commerce Users by Gender, 2015
(%)

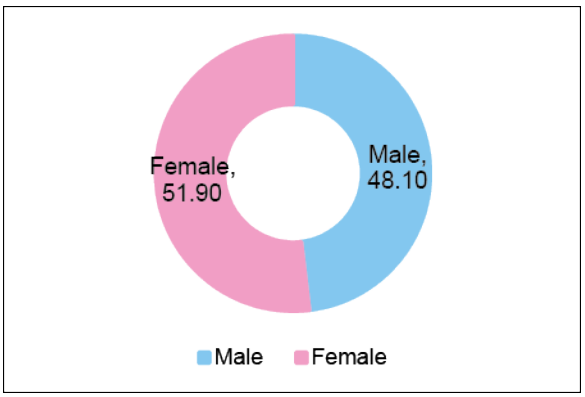


Source: Author's Calculation Based on Susenas 2015, Statistics Indonesia.

The figure above shows that there is still a large potential for e-commerce to grow in Indonesia. However, further growth of e-commerce in Indonesia requires clear laws and regulation. The launching of an e-commerce road map still needs more collaboration between government, business, and academics so that Indonesia can develop a great environment for e-commerce. The Ministry of Communication and Information Technology (MCIT) of Indonesia together with IMT Mitra Solusi conducted a survey of e-commerce with some variables about regulation. Based on the survey, e-commerce users thought that e-business activities have been regulated in Indonesia. The survey conducted by MCIT of Indonesia and IMT Mitra Solusi showed that 92% of buyers agreed about digital certificate regulation from certificate authority, while only 63.2% sellers agreed about that. Only half of sellers and 50.3% of buyers agreed that regulation has legal assurance. In addition, 54% of buyers and 53% of sellers agreed that regulation is in line with the rapid changes of technology. The Government of Indonesia has also been trying to make it so that micro, small, and medium-sized enterprises (MSMEs) could be e-commerce users, particularly local Indonesian e-commerce start-ups. The regulation will ensure that foreigners who do not meet the threshold of $7.3 million but have a joint venture with a local partner, can only own a maximum of a 49% stake in the business (Kinasih 2016). This is because of the expectation of the Indonesian government in 2020 that e-commerce sales will increase to $130 billion due to the Presidential Regulation Number 44 of 2016.

When considering all e-commerce users, it is estimated that women's internet activities that involve receiving/placing orders of goods/services were more than men. There were 51.9% women who received/placed orders of goods/services, while there were 48.1% men who received/placed orders of goods/services. This difference can be because of the different preferences of females and males. A study of Zhang and Pennacchiotti (2013) analyzed whether women and men tend to buy items from different categories, and the results show that women buy significantly more than men in 10 categories (the most female-polarized categories are jewelry and watches, crafts, and clothing, shoes, and accessories). Meanwhile, men buy significantly more than women in 16 categories, with the most polarized being toys and hobbies, collectibles, and sports memorabilia (Zhang and Pennacchiotti 2013).

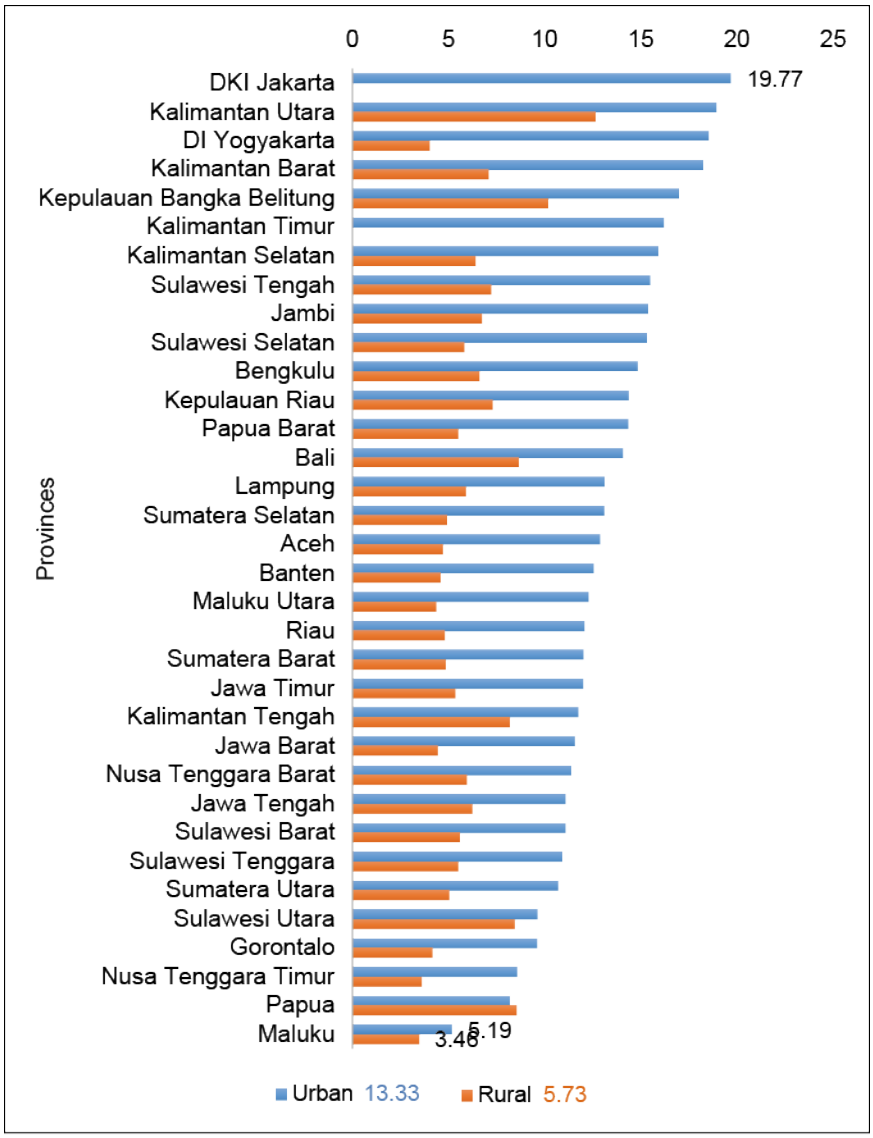
Figure 4: Percentage of E-commerce Users by Gender, 2015
(%)



Source: Author's Calculation Based on Susenas 2015, Statistics Indonesia.

Figure 5 shows that in almost all the provinces in Indonesia, there were more e-commerce users who live in urban areas compared to those who live in rural areas (13.33% in urban and 5.73% in rural areas.)[1] The study of Guido de Blasio (2008) showed that the use of e-commerce is basically unaffected by the size of the city where the household is, and the only goods and services that are ordered by people in more isolated areas are leisure activities and cultural items. Marie Sicat (2016), the ICT Policy Review Programme Coordinator of UNCTAD suggested that e-commerce can be fostered for rural development by building the rural producers' capacity to use e-commerce to market and sell their products, or purchase intermediary products for their businesses. Moreover, she suggested building the capacity of rural inhabitants to be online consumers.

Figure 5: E-Commerce Users by Area Classification, 2015
(%)

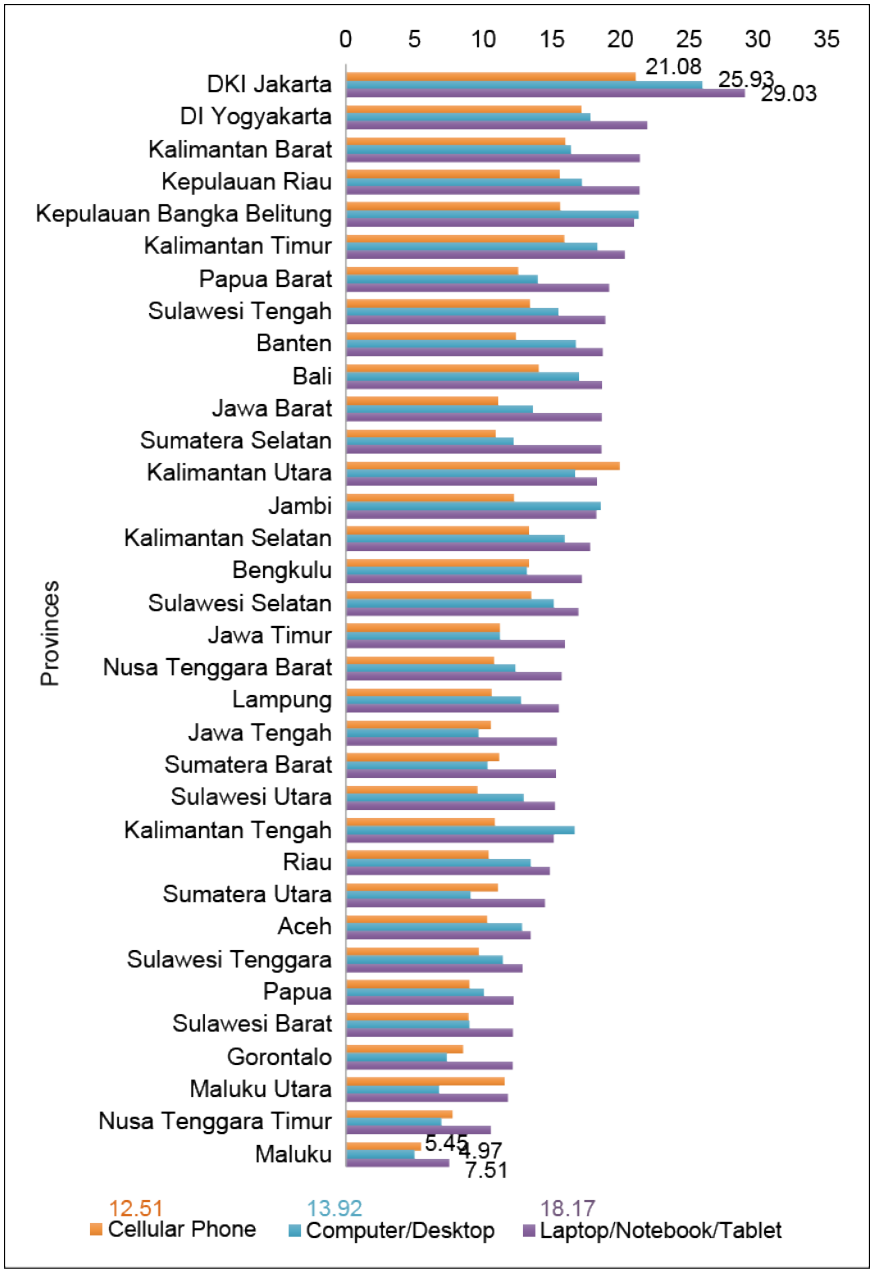


Source: Author's Calculation Based on Susenas 2015, Statistics Indonesia.

[1] Sample in rural area in DKI Jakarta is not available because all parts of DKI Jakarta Province are administrative cities.

The percentage of individuals who received/placed orders for goods/services in urban areas in Indonesia were more varied than in rural areas. The percentage of e-commerce users in rural areas with variance was 10.74, while the variance in rural areas was 4.63. Figure 5 also shows that the lowest percentage of e-commerce users in urban and rural areas was in the eastern part of Indonesia. The biggest gap between urban and rural areas was in Yogyakarta, while the smallest gap was in Papua. These facts could indicate the disparity between urban and rural areas in Indonesia, particularly the disparity in internet access and technology.

Figure 6: E-Commerce Users by Media Used, 2015
(%)

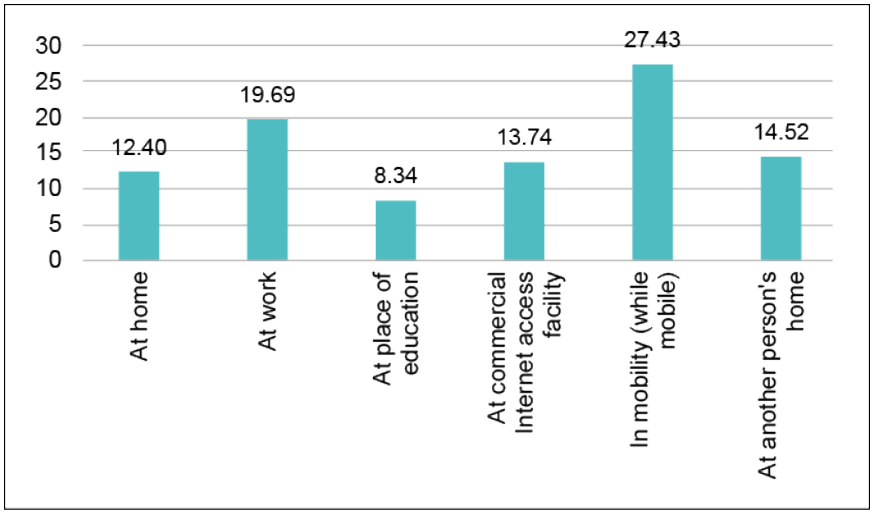


Source: Author's Calculation Based on Susenas 2015, Statistics Indonesia.

Most of the e-commerce users in Indonesia (18.17%) used laptop/notebook/tablet to receive/place orders of goods/services via the internet, while 13.92% were individuals using a computer/desktop to receive/place orders of goods/services. Additionally, 12.51% of individuals used cellular phone (mobile phone) for e-commerce transactions. Although in Indonesia overall, individuals mostly used a laptop/notebook/tablet, in some provinces, the numbers were different. In Kalimantan Tengah, Jambi, and Kepulauan Bangka Belitung, most individuals used a computer/desktop to receive/place orders of goods/services. Meanwhile, in Kalimantan Utara, most individuals received/placed orders of goods/services by using cellular phone (mobile phone). The study of Wetzlinger, Auinger, and Dorflinger (2014) shows that users can carry out tasks more effectively and efficiently on laptops. Moreover, tablets got a high rate in perceived usability and user experience, indicating that a pleasant and meaningful experience depends on characteristics other than work-related qualities such as effectiveness and efficiency (Wetzlinger, Auinger, and Dorflinger 2014).

The results also show that 27.43% of individuals who receive/place orders of goods/services via the internet did so while mobile (i.e. in transit or between places). Figure 7 shows that the highest percentage of e-commerce users by access location was in the category of *mobility*. In addition, there were only 8.34% of individuals who received/placed orders of goods/services at their place of education.

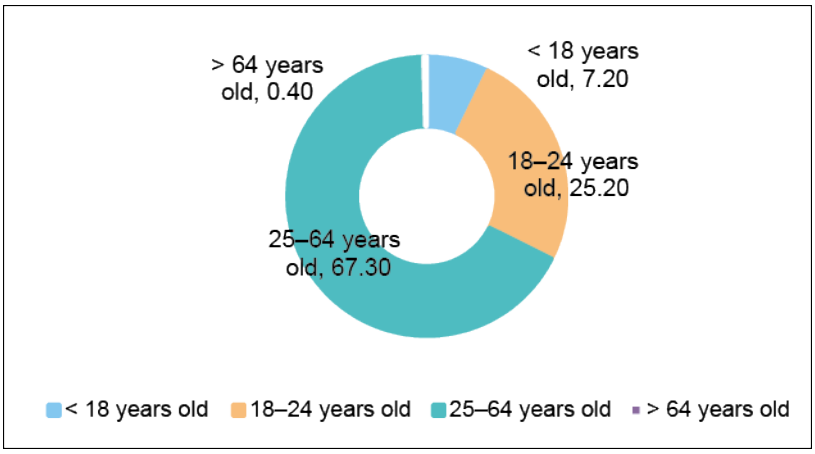
Figure 7: E-Commerce Users by Access Location
(%)



Source: Author's Calculation Based on Susenas 2015, Statistics Indonesia.

Most of the internet activities that involved receiving or placing orders of goods/services were done by individuals who were 25 to 64 years old. It can be said that individuals of working age are the most dominant e-commerce users in Indonesia in 2015 with percentage of 67.3%. The second most dominant age group was 18 to 24 years old with percentage of 25.2%.

Figure 8: E-commerce Users by Age Group, 2015
(%)

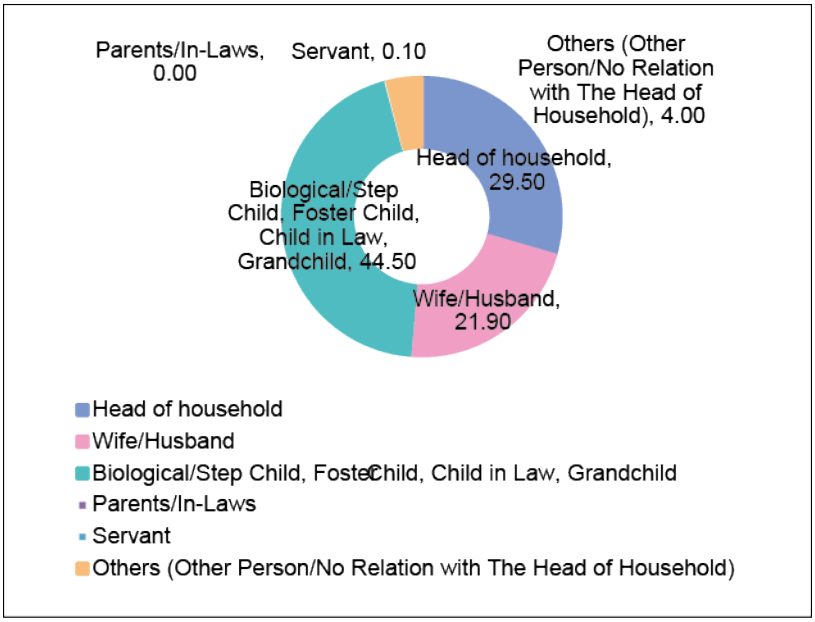


Source: Author's Calculation Based on Susenas 2015, Statistics Indonesia.

While there were no e-commerce users that had a relationship to the head of household as parents/in-laws, this might be caused by the age of parents/in-laws, which were categorized as old/very old, and they did not have any internet skills.

Furthermore, most of the e-commerce users were from the category of biological/ step-child, foster child, child-in-law, and grandchild, with a percentage of 44.5%. This is followed by head of household (29.5%) and wife/husband (21.9%).

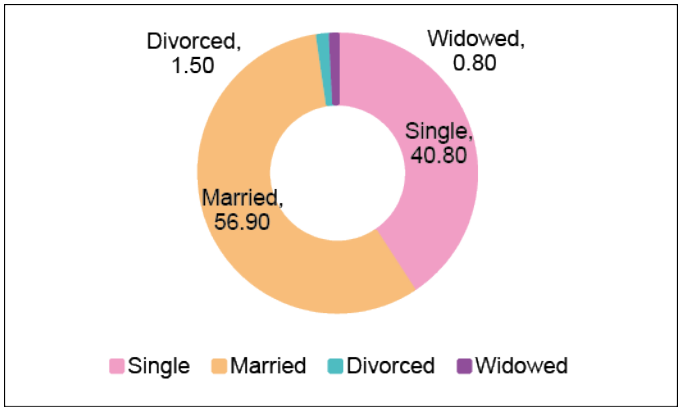
Figure 9: E-Commerce by Relationship with Head of Household, 2015
(%)



Source: Author's Calculation Based on Susenas 2015, Statistics Indonesia.

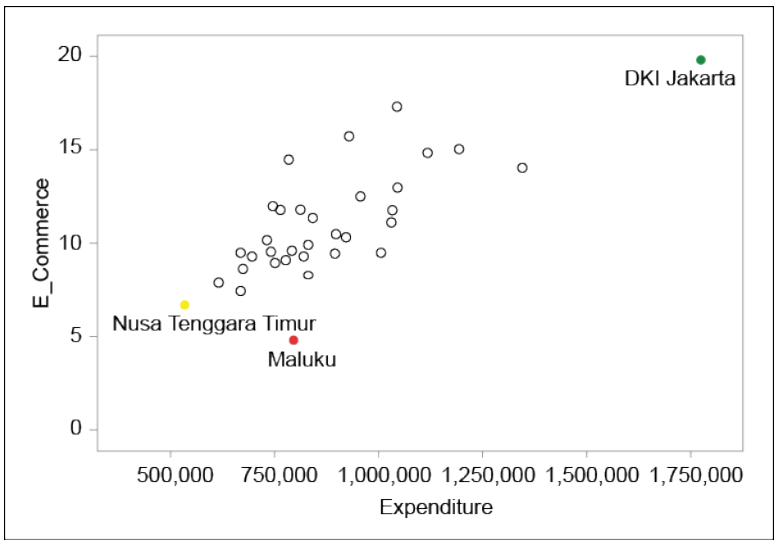
More than half of e-commerce users (56.9%) have been married, while 40.8% of e-commerce users were single. Meanwhile, there were only 0.8% widowed and 1.5% divorced e-commerce users. Bhatnagar, Misra, and Rao (2000) showed that marital status only had a significant effect on the purchasing of hardware out of 17 product categories.

Figure 10: E-Commerce by Marital Status, 2015
(%)



Source: Author's Calculation Based on Susenas 2015, Statistics Indonesia.

Figure 11: Plot of Percentage of E-Commerce Users (%) **and Average of Expenditure in a Month** (Rp) **by Province in Indonesia 2015**



Source: Statistics Indonesia and Author's Calculation.

Figure 11 shows that provinces with high percentage of e-commerce users also have high average of monthly expenditures. The province with the highest percentage of e-commerce users and average of expenditure in a month is DKI Jakarta. On the other hand, Nusa Tenggara Timur has a very low percentage of e-commerce users and average of monthly expenditures. The percentage of e-commerce users in Maluku was lower than Nusa Tenggara Timur, but average of expenditures in Maluku was higher than Nusa Tenggara Timur. This indicates that an increase in average expenditures in Maluku was not always followed by an increase in e-commerce users.

3.1 Log Linear Model

Based on a Chi square test of independency, with a 95% significance level, there are associations between e-commerce with gender, age, education, and working sector. Assume that V is e-commerce, W is gender, X is age, Y is education, and Z is working sector with $,j,k,l$ and m as category level. It can be obtained through a five-way contingency table with $i \times j \times k \times l \times m$ cells.

The log linear model as follows:

> (V, W, X, Y, Z, VX, VY, XY, VW, WX, WY, VZ, XZ, YZ, WZ, VXZ, WXZ, WYZ, WXY, VXZ, VYZ, XYZ, VWY, VWX, VXY, VWXY, VXYZ, VWXZ, VWYZ, WXYZ, VWXYZ)

The log linear model shows the interaction between two variables, among three variables, four variables, and five variables. Based on partial association by using Chi square tests, all of the interactions are significant with a 95% significance level. The odds ratio indicates that women have a higher tendency than men to conduct e-commerce transactions. Women tend to conduct e-commerce transactions 1.148 times more than men. This is similar to the descriptive analysis that showed the percentage of women receiving/placing orders of goods/services were more than men.

In addition, the tendency of individuals to use e-commerce who were aged 18 to 24 years old is higher than individuals who were aged less than 18 years old (1.25 times). Individuals who were aged 25 to 64 years old tended to carry out e-commerce transactions 1.31 times more than individuals who were aged less than 18 years old. Meanwhile, individuals who were aged less than 18 years old tended to conduct e-commerce transactions 1.034 times more than individuals who were aged more than 64 years old.

The study also shows that individuals who work in the services sector have a higher tendency toward e-commerce than those who work in other sectors. Individuals who work in the services sector tend to conduct e-commerce transactions 2.63 times more than individuals who work in others sectors. The following table shows the comparison between individuals who work in others sector with individuals who work in agriculture; mining and quarrying; manufacturing; electricity and gas; construction; trade, hotel, and restaurant; transportation, storage, information, and communication; finance and insurance; and services.

Table 2: Odds Ratio of E-Commerce Users Based on Working Sector

Working Sector	Estimate	Odds Ratio	1/(Odds Ratio)
(1)	(2)	(3)	(4)
Agriculture	0.427	1.53	0.65
Mining and Quarrying	1.048	2.85	0.35
Manufacturing	0.052	1.05	0.95
Electricity and Gas	–0.052	0.949	1.05
Construction	–0.392	0.68	1.47
Trade, Hotel, and Restaurant	0.012	1.012	0.988
Transportation, Storage, Information, and Communication	–0.228	0.796	1.26
Finance and Insurance	–0.225	0.7985	1.25
Services	–0.979	0.38	2.63

Source: Author's Calculation, Processed by SPSS.

Finally, well-educated individuals have a lower tendency to conduct e-commerce transactions than less-educated individuals, but the tendency becomes higher for individuals who attained a bachelor degree level of education and above. This is in line with some studies (Bagchi and Mahmood 2004; Bellman et al. 1999; Donthu and Garcia 1999; Mahmood et al. 2004 quoted in Zhou, Dai, and Zhang 2007) that did not find a positive relationship between education and the time and money available for online shopping. In addition, Zhou, Dai, and Zhang (2007) stated that online shoppers are not necessarily more educated; this can be explained by the fact that online shopping is a relatively easy task. The preliminary findings in a study note that new technologies will increase the demand for highly skilled workers to run them (Bresnahan quoted in Terzia 2011), but also for new managers who have to make decisions in more information-intensive organizations (ECLAC in Terzia 2011).

Table 3: Odds Ratio of E-Commerce Users Based on Educational Attainment

Education	Estimate	Odds Ratio	1/(Odds Ratio)
(1)	(2)	(3)	(4)
Elementary School	1.524	4.59	0.22
Junior High School	1.152	3.16	0.32
Senior High School	0.455	1.58	0.63
Bachelor Degree	–0.214	0.81	1.23
Master and Doctoral Degree	–1.106	0.33	3.03

Source: Author's Calculation, Processed by SPSS.

3.2 Regression Analysis

In this section, the probit regression model was estimated to analyze the determinants of individuals for conducting e-commerce transactions. Basically, the result of the probit model will be similar to the logit model, but by using probit model there will be no odds ratio to be interpreted. If the function of the log linear model is Poisson distribution, the function of the probit model is normal distribution. The logit model cannot be obtained because it did not fulfill the model selection. However, the logit and probit models will have similar results. The logit and probit links are symmetric; about 0.5 (Agresti, 2002).

Based on the Model Fitting Information, with a 95% significance level, a model with predictors is better than a model without predictors. The probit model is as follows:

$$F(Z) = \Phi[-2.882 + 0.102Gender - 0.263Age + 0.573Education + 0.031Sector]$$

With a 95% confidence level, gender, age, education, and working sector affect individuals in relation to whether they receive/place orders of goods/services. Assuming that all gender is male, age between 25 to 64 years old, education at the level of bachelor degree, and working sector as services, then the probability of the person receiving/placing orders for goods/services is 16.133. If the gender is female, age between 25 to 64 years old, education level at bachelor degree, and working sector as services, then the probability for them to receive/place orders of goods/services is 18.513%. Females have a higher probability of conducting e-commerce transactions than males, which is accordance with the result of the log linear model.

If gender is male, age between 18 to 24 years old, education of bachelor degree, and working sector is services, then the probability for receiving/placing orders for goods/services is 23.117%. Moreover, if gender is male, age between 25 to 64 years old, education as having completed junior high school, and working sector is services, then the probability for receiving/placing orders for goods/services is 1.60%. If gender is male, age between 25 to 64 years old, education bachelor degree, and working sector is agriculture, then the probability for receiving/placing orders for goods/services is 10.638%. Therefore, based on the probit model, it can be concluded that the older the individual, the smaller the probability that they will conduct e-commerce transactions; the higher the education that she/he has completed the higher the probability; and that individuals who work in tertiary sectors will have a higher probability than individuals who work in primary or secondary sectors. The use of electronic means and the internet can make the process of initiating and doing trade a lot easier, faster, and less expensive (Terzia 2011). The results of Owens and Sarov (2010) also found that gender and educational level affect attitudes toward shopping online. Bigne, Ruiz, and Sanz (2005) stated that the priority segment for companies to consider for marketing should be young people, both men and women, preferably those with experience of internet shopping and from the middle class or above. This is because young people have been more in contact with new technologies, so their level of exposure is much higher and they also show the most positive attitude toward innovation and change (Bigne, Ruiz, and Sanz 2005).

Table 4: Estimation Result of Probit Model

Parameter	Estimate	95% Wald's Confidence Interval		Standard Error	Sig.
		Lower	Upper		
(1)	(2)	(3)	(4)	(5)	(6)
(Intercept)	–2.882	–2.884	–2.880	0.0010	0.000
Gender	0.102	0.102	0.103	0.0004	0.000
Age	–0.263	0.264	0.262	0.0004	0.000
Education	0.573	0.572	0.573	0.0002	0.000
Working Sector	0.031	0.031	0.031	6.5211E-005	0.000

Source: Author's Calculation, Processed by SPSS.

4. SUMMARY AND CONCLUSION

This paper studies the demographic and socioeconomic characteristics of e-commerce users in Indonesia in 2015. Descriptive analysis gives the indication of individuals' characteristics and their effects on how likely a person is to receive/place orders of goods/services online. The indication from the descriptive analysis is in line with the result of the log linear model, particularly the interpretation of odds ratios. The log linear model helps us to analyze the pattern of association among variables.

Based on partial association by using Chi square tests, all of the interactions are significant with a 95% significance level. The odds ratio indicates that women have a higher tendency than men to conduct e-commerce transactions. Individuals aged 25 to 64 years old tend to carry out e-commerce transactions 1.31 times more than individuals who aged less than 18 years old; this tendency is higher than for individuals who are aged 18 to 24 years old and 64 years old and above. The study also shows that individuals who work in the services sector have a higher tendency than those who

work in other sectors. It can be seen from the result of the odds ratio that well-educated individuals have a lower tendency to do e-commerce transactions than less-educated individuals, but the tendency becomes higher for individuals who attained a bachelor degree or higher.

This study also found that in Indonesia's case from an individual perspective, demographic and socioeconomic characteristics can be determinants of whether a person will receive/place orders of goods/services over the internet. It is proved by a probit model with a 95% significance level that gender, age, education, and working sector significantly affected whether individuals would conduct e-commerce transactions. It also implies that to enlarge the e-commerce market, the demographic and socioeconomic characteristics of e-commerce users in Indonesia should be taken into account.

E-commerce can facilitate the selling/buying of activities with specific targeted consumers and the market can be enlarged by focusing on the target. Odds ratios and probability can provide guidance for this. Individuals can choose/place product easily based on their needs and preferences. Businesses can offer greater choices for females. E-commerce can increase productivity as young and old individuals can easily sell/buy products without going anywhere. E-commerce transactions have the potential to be higher quality than traditional transactions, because it leads us to think more efficiently. The results of working sector variable indicate that the rapid growth of e-commerce has potential to change the structure of the Indonesian economy.

For future research, it is important to take into account the cross-border e-commerce activities in order to analyze how trade has changed due to digitization in terms of international trade.

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