

Assessing the Role of Information and Communication Technology on Business Growth in Sumatera Island, Indonesia

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ABSTRAK

Teknologi informasi dan komunikasi (TIK) telah menjadi bagian tak terpisahkan dari kehidupan sehari-hari, termasuk dalam bisnis. TIK adalah teknologi yang digunakan untuk menganalisis, menyimpan, dan menyebarkan informasi, serta mendorong operasi yang saling terkait dan efisien guna mendukung kinerja bisnis yang lebih baik. Penelitian ini bertujuan untuk menguji perbedaan pertumbuhan bisnis antara perusahaan yang menggunakan dan tidak menggunakan teknologi informasi dan komunikasi (TIK). Penelitian dilakukan di Pulau Sumatera, Indonesia. Sumatera dipilih karena meskipun merupakan penyumbang ekonomi terbesar kedua bagi Indonesia setelah Jawa, namun indeks perkembangan TIK-nya rendah dibandingkan dengan wilayah lain. Studi ini memanfaatkan gelombang data publik terbaru dari Survei Perusahaan Bank Dunia untuk Indonesia. Enterprise Survey mensurvei 194 perusahaan di dua provinsi: Provinsi Sumatera Utara dan Provinsi Lampung. Chi-square dan Mann-Whitney U Test digunakan untuk menganalisis data. Berdasarkan hasil temuan, TIK lebih umum digunakan di perusahaan besar, sementara lebih jarang digunakan di UKM. Pertumbuhan bisnis perusahaan yang menggunakan dan tidak menggunakan media email berbeda secara signifikan, sedangkan perbedaan dalam pemanfaatan situs web tidak signifikan. Perbedaan kecil dalam penggunaan situs web dapat dikaitkan dengan semakin populernya perantara dalam platform e-niaga yang inovatif.

ABSTRACT

Information and communication technology (ICT) has become an indispensable part of daily life, including in business. ICT is a technology that is used to analyze, store, and disseminate information, as well as to encourage interconnected and efficient operations in order to support better business performance. This study aims to examine the differences in business growth between companies that used and did not use information and communication technology (ICT). The study takes place on Sumatera Island in Indonesia. Sumatera was chosen because, despite being Indonesia's second most important economic contributor after Java, its ICT development index is low in comparison to other regions. This study made use of the most recent wave of public data from the World Bank's Enterprise Survey for Indonesia. The Enterprise Survey surveyed 194 companies in two provinces: North Sumatera Province and Lampung Province. Chi-square and the Mann-Whitney U Test were used to analyze the data. According to the findings, ICT is more commonly used in large corporations, while it is less commonly used in SMEs. The business growth of companies that use and do not use email differed significantly, whereas the difference in website utilization was insignificant. The minor difference in website usage can be attributed to the growing popularity of intermediaries in innovative e-commerce platforms.

1. INTRODUCTION

Information and communication technology (ICT) has become an indispensable part of daily life, including in business (Zhang et al., 2008). ICT is a technology that is used to analyze, store, and disseminate information, as well as to encourage interconnected and efficient operations in order to support better business performance (Perales et al., 2018). ICT encompasses a wide range of technological devices and resources, including computers, the internet, email, websites, and blogs; live broadcast technologies like radio, TV, and webcasts; delayed broadcast technologies like audio-video players and podcasts; and communication technologies like fixed telephones, cell phones, satellite, audio-conference,

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and video-conference (Zuppo, 2012). Researchers continue to pay close attention to ICT use within businesses in this digital era (Gërguri-Rashiti et al., 2017). The researchers suggested that ICT plays an essential role in achieving companies' growth. The utilization of ICT can be relevant to various business functions and in different business sectors (Gurău et al., 2012; Heintze & Bretschneider, 2000). The current study focused on analyzing the differences in business growth between companies that use and do not use ICT for their operations. There are two reasons that led to the urgency of this research.

First, although numerous studies have been conducted to investigate ICT and its relationship to companies' outcomes as productivity and performance, the majority of the studies have been conducted in the context of advanced economies. For instance, consider the impact of broadband infrastructure and ICT usage on company performance in the United Kingdom (DeStefano et al., 2018) or the impact of employment and wage on broadband deployment in North America (Ivus & Boland, 2015). This study focuses on an emerging economy context, that is Indonesia, particularly companies in Sumatera Island. Second, Even though it is commonly assumed that the western region of Indonesia has a higher level of ICT than the eastern region, it appears that this is not entirely true when considering the case of Sumatera (Agahari, 2018). According to data from the Central Bureau of Statistics, Sumatera provinces have a low ICT development index (Dewi, D. M. & Wulandari, 2018). Thus, Sumatera is an interesting context to discuss because it is the second-largest economic contributor in Indonesia after Java, with a contribution value of 20% of the national contribution. In 2045, it is estimated that Sumatera's contribution to the Indonesian economy will increase by 28%. The purpose of this study is to examine the differences between companies in Sumatera that use and do not use ICT. More specifically, this study compared the characteristics and growth of the studied companies into two groups. This analysis can aid in understanding how ICT is used by businesses, as well as the similarities and differences in the characteristics and growth of the businesses. This paper is structured as follows. The first section discusses the background and purpose of the study. The second section provides a brief literature review. The third section explains the methodology that includes the data used in detail along with the analysis techniques. The fourth section explains the results of the analysis, which are at the same time discussed in relation to previous relevant studies. The last section is a conclusion that contains a summary of important results from the study, along with limitations and suggestions for future research.

2. METHODS

The data used in this study is public data derived from a survey conducted by the World Bank known as the Enterprise Survey (The World Bank, 2015). Enterprise Survey is a survey at the company level that is carried out globally in various countries with different survey times. This survey asks companies about various aspects from infrastructure to business obstacles, including email and website utilization. For business growth, two indicators used are annual sales growth and annual employment growth. Annual sales growth and annual employment growth are in the form of a percentage. Referring to calculations from the World Bank website, the formula for calculating the percentage of annual sales value growth is as follows.

$$= \left(\frac{1}{t}\right) * \frac{(D2 - N3)}{[(D2 + N3)/2]}$$

t is the difference between the last year and the previous year asked. With the same format formula, the formula for calculating annual employee growth is as follows (The World Bank, 2020).

$$= \left(\frac{1}{t}\right) * \frac{(L1 - L2)}{[(L1 + L2)/2]}$$

In Indonesia, the latest wave of the Enterprise Survey publication was in 2015 (The World Bank, 2015). The previous wave survey was in 2009. In this study, the latest 2015 dataset was used. In Indonesia, there were nine sample provinces which two of which were located in Sumatra, namely North Sumatra Province and Lampung Province. The sample of companies in North Sumatra Province mainly came from Medan City, Deli Serdang Regency, and Binjai City. In Lampung Province, the sample of companies came from Bandar Lampung City, Central Lampung Regency, East Lampung Regency, South Lampung Regency, Metro City, Pringsewu Regency, and Tanggamus Regency. The total sample of companies in the two provinces was 194 companies from various industries and sizes. The size of the company in this survey is based on the number of workers in which small companies consisted of 5-19 employees, medium-sized companies consisted of 20 to 99 employees, and large companies consisted of ≥100 employees.

The data were analyzed using several statistical techniques, including descriptive statistics, Chi-square Test, and Mann-Whitney U Test. Descriptive statistics were used to provide an overview of the

respondents' profile, such as sector, province, city, and company size. Chi-square Test and Mann-Whitney U Test tested techniques in non-parametric groups. This technique was chosen since the results of preliminary checking of the data distribution showed that the analyzed data were not normally distributed. More specifically, the Chi-Square Test was used to test the differences between the characteristics of companies using and not using ICT. The company characteristics exist at the sector and provincial/city level, and the company size is categorized on a nominal scale. The Mann-Whitney U Test is a test to test the difference between two independent groups with continuous measurements (Pallant, 2011). In this study, the Mann-Whitney U Test was used to test the differences between companies that utilize and do not utilize ICT from the aspect of company business growth. The company's business growth was measured by the percentage of annual sales growth, and the percentage growth in the number of workers is a variable with *continuous* data with an interval scale. IBM SPSS 25 software was used to assist the calculation.

3. RESULTS AND DISCUSSIONS

Results

The basic characteristics of the companies sampled are presented in Table 1. Most of the samples, around 83%, are engaged in the manufacturing sector. The proportion of samples in the Provinces of North Sumatera and Lampung is balanced in the range of 50%. For company scale, most are small and medium enterprises (SMEs) which is a combination of small and medium companies with a sample size of around 75%. The sample companies mostly did not utilize email in their company operations (60.8%) and websites as well (74.2%). This result is not surprising when compared to previous studies because larger companies have more resources than SMEs and a more positive attitude toward the use of ICT (Ntwoku et al., 2017). Nevertheless, such a company profile is interesting because in today's digital era, including around 2014-2015, when the survey was conducted, most of the companies did not utilize email and websites as the basic ICT form of communication.

Table 1. Company Characteristics & ICT Utilization

	Characteristics	Frequency	%
Sector	Manufacturing	161	83.0
	Services (retail)	15	7.7
	Services (non-retail)	18	9.3
Province	North Sumatera	98	50.5
	Lampung	96	49.5
Business scale	Small	78	40.2
	Medium	68	35.1
	Large	44	22.7
E-mail	Yes	76	39.2
	No	118	60.8
Website	Yes	50	25.8
	No	144	74.2

The Chi-square test results analyzing the differences in characteristics between the companies that utilize and do not utilize email are presented in Table 2. From the analysis, the proportion of differences between sectors ($p > 0.05$) and the province where the companies are located does not show a significant difference ($p > 0.05$). This is different from the findings of previous researchers, which revealed that different regions had a different level of digitalization (Pick & Nishida, 2015). This difference could be due to the fact that Pick & Nishida's study was conducted at the country level, while this study was carried out at the provincial level in one country.

Table 2. Chi-square Test of ICT Utilization

Characteristics		Email Utilization				Sig.
		Yes		No		
		N	%	N	%	
Sector	Manufacturing	64	39.8	97	60.2	0.867
	Services (retail)	6	40.0	9	60.0	
	Services (non-retail)	6	33.3	12	66.7	
Province	North Sumatera	37	37.8	61	62.2	0.793

Characteristics		Email Utilization				Sig.
		Yes		No		
		N	%	N	%	
Business scale	Lampung	39	40.6	57	59.4	0.000
	Small	4	5.1	74	94.9	
	Medium	33	48.5	35	51.5	
	Large	39	88.6	5	11.4	
Characteristics		Website Utilization				Sig.
		Yes		No		
		N	%	N	%	
Sector	Manufacturing	41	25.5	120	74.5	0.974
	Services (retail)	4	26.7	11	73.3	
	Services (non-retail)	5	27.8	13	72.2	
Province	North Sumatera	28	28.6	70	71.4	0.367
	Lampung	22	22.9	74	77.1	
Business scale	Small	1	1,3	77	98.7	0.000
	Intermediate	19	27.9	49	72.1	
	Big	30	68.2	14	31.8	

The Mann-Whitney U Test gives no statistically significant difference in business growth between companies that utilize and do not utilize the website, as shown in Table 3. The annual sales growth rate of companies that utilize websites ($Md=-1.52\%$, $n=50$) does not differ significantly from companies that do not utilize websites ($Md = 0.00\%$, $n=143$) with a value of $p= 0.82$. Interestingly, these results even show that companies that utilize websites actually have negative growth compared to companies that do not.

Table 3. Mann-Whitney U Test of Email and Website Utilization and Business Growth

Business growth	Email Utilization				Sig.
	Yes		No		
	N	Median / Mean Rank	N	Median / Mean Rank	
Annual sales growth	75	1.17% / 108.69	118	-0.29% / 89.75	0.020
Annual employee growth	75	0.71% / 108.51	118	0.00% / 89.86	0.018
Business growth	Website				Sig.
	Yes		No		
	N	Median / Mean Rank	N	Median / Mean Rank	
Annual sales growth	50	-1.52% / 95.47	143	0.00% / 97.35	0.822
Annual employee growth	49	1.33% / 108.50	144	0.00% / 93.09	0.085

Discussion

In contrast, there is a significant difference in the business scale of the company ($p<0.01$). When looking at the frequency and percentage of companies, this can be understood because the difference is indeed quite noticeable among large companies, medium companies, and small companies. Nearly 90% of large companies utilize email to communicate with their customers and suppliers, while, on the contrary, more than 90% of small companies do not utilize email as their communication medium. According to the literature, these findings corroborate previous research indicating that larger companies have a more favorable attitude toward ICT use than smaller companies (Ntwoku et al., 2017). It is widely acknowledged that SMEs are the primary socioeconomic drivers in many parts of the world (AlBar & Hoque, 2019). Furthermore, in today's digital age, information and communication technology (ICT) plays an important role in business (Sunday & Vera, 2018). However, the findings of this study show that ICT adoption is still not widespread among SMEs, at least among the companies in the research sample.

Similar results are also found in the Chi-square Test analysis aiming to test differences in company characteristics based on website utilization, as shown in Table 3. The difference in characteristics between companies that utilize and do not utilize websites is not statistically significant when viewed from the sector and provincial sides ($p>0, 05$). Statistically, significant differences were found on the business scale of the company ($p>0.05$). This pattern is similar to the results of email utilization analysis. Since email and the web are both basic ICT tools, it is not surprising that email and the web are both used in the same way (Munikrishnan et al., 2019). Most small-sized companies, even almost

all (around 99%), do not utilize websites to support company operations; one-third of medium-sized companies, or about 30%, utilize websites; and in large companies, around 70% utilize websites to support the sustainability of their business.

The significant differences between companies that utilize and do not utilize ICT in terms of business scale can be explained by the resources they have, the attitude, and the practical needs of daily business operations. In terms of resources, it has been discussed in the literature that SMEs have limited resources compared to large companies so that the impact of investment in ICT is more limited or even non-existent (Gërguri-Rashiti et al., 2017; Hadjimanolis, 2000). These resources are not only in the form of fund availability but also in the form of human resources (HR) who are able to operate or maintain their use in a sustainable manner. According to previous research, larger companies have a more positive outlook on ICT than SMEs (Ntwoku et al., 2017). In terms of practical needs, large companies usually have a high business complexity in terms of both input heterogeneity and the dynamism of their business environment (Neirotti et al., 2018). Whereas, previous literature revealed that ICT actually has the potential to provide benefits for SMEs, which, if used efficiently, can support them to compete with larger-scale businesses (AlBar & Hoque, 2019).

The results of the Mann-Whitney U Test analysis testing the differences in business growth between companies that utilize and do not utilize email can be seen in Table 4. The analysis results of email utilization indicate that there are statistically significant differences between companies that utilize and do not utilize email. The annual sales growth rate of companies that utilize email of ($Md = 1.17\%$, $n=75$), while companies that do not utilize email of ($Md = -0.29\%$, $n = 118$) with a value of $p = 0.020$. For annual employment growth rates, the test results also show a statistically significant difference between companies that utilize and do not utilize email as a form of communication with customers and suppliers. Annual employment growth rates of companies that utilize email of ($Md = 0.71\%$, $n=7$), while companies that do not utilize email of ($Md = 0.00\%$, $n=118$) with a value of $p = 0.018$. Email utilization includes basic written and asynchronous ICT technology (Hewitt, 2006; Munikrishnan et al., 2019). The results of the analysis show that there are significant differences between companies who utilize and do not utilize email both in annual sales growth and annual employment growth. The median annual sales growth rate of companies that utilize emails is positive at 1.17%, while those that do not utilize negative emails are -0.29%. Likewise, for annual employee growth, the median value for companies that utilize email is higher than those that do not utilize email, to be exact 0.71% compared to 0.00%. With more than 150 million Indonesians using the internet, it's no surprise that email has become a standard means of communication, both personally and professionally (Gunawan et al., 2020). Customers and suppliers appear to benefit from companies' use of email.

The difference in significance between email and website is somewhat surprising. If the company that utilize and do not utilize email shows a statistically significant difference, then this does not apply to the use of the website. In fact, in the ICT adoption literature, utilization of email and website in business organizations are both categorized as basic utilization (Munikrishnan et al., 2019). Several explanations can be given for this result. The use of email appears to be very significant in encouraging more effective internal coordination (Hewitt, 2006). The study was indeed conducted in the context of developed economies, namely the UK, more than a decade ago. However, today it seems that this also applies to emerging economies such as Indonesia. This, in turn, encourages more productive external communication throughout the supply chain, especially with clients and suppliers, as the focus in the survey questionnaire.

Another explanation relates to the existence of alternatives to the website, either in the form of social media or trading platforms is known as intermediaries (Spulber, 2019). Indonesia is currently growing electronic-commerce platforms with low cost or even free and very wide coverage, including Tokopedia, BukaLapak, Lazada, or Shopee (Sfenrianto et al., 2020). In contrast, the utilization of websites used by companies requires set-up and maintenance costs. For annual employee growth, the Mann-Whitney U Test results show the same results with annual sales growth. There are no significant differences found between companies that utilize and do not utilize websites. The difference of those two results, unlike the annual sales growth, the median value of the growth of the annual workforce of companies using websites is higher ($Md = 1.33\%$, $n=49$) than companies that do not ($Md = 0.00\%$, $n=144$) with the value of $p = 0.085$. However, this difference in employment growth rates is not statistically significant. There is a statistically significant difference in business growth between companies who use ICT and those who do not, according to these results. This can be explained by the growth of electronic-commerce platforms such as Amazon, eBay, and Alibaba on the global level, or Tokopedia, Bukalapak, and Shopee on the domestic level (Spulber, 2019). Early in their development, intermediaries were not as well-known and difficult to comprehend. However, as of now, they are widely known, understandable, and

accessible to nearly everyone. Intermediaries have become a significant part of the economy (Spulber, 2019).

This study has implications for research to enhance knowledge on basic ICT utilization and companies' growth, especially in the context of emerging economies. More specifically, for regions or islands that are major but not the largest in terms of population or contribution to the national economy like Sumatera in Indonesia. This may apply to other archipelagic countries such as Japan, especially Honshu, Kyushu and Shikoku islands, instead of Hokkaido Island, and the Philippines such as Visayas & Mindanao Islands, instead of Luzon Island. For managers, in particular companies in Sumatera, this study could also provide insights about companies' performance that utilized and did not utilize basic ICT tools for their operations. This study has several limitations. First, regarding the availability of ICT variables in the Enterprise Survey. This is because only the two technologies -email and website- are available in the survey dataset. In the literature, the adoption of email and website which is static is included in the basic utilization. Future research, if data availability is allowed, can analyze a more advanced ICT utilization, such as an intranet, DBMS (Database Management System), social media, ERP (Enterprise resource planning), audio-video conference technologies, interactive websites, or integrated online transaction processing. Second, the scope of this study is also limited since the sample companies are only in Sumatera; therefore, future research can be carried out in different or broader areas, using similar or different datasets.

4. CONCLUSION

This study found that differences in business growth in companies that utilize emails differ significantly compared to companies that do not. Meanwhile, the difference is not significant in terms of website utilization. The significant difference in business growth between companies that utilize and do not utilize email indicates that this time, email helps to smoother communication between companies and customers and suppliers. There is no significant difference between companies that utilize and do not utilize websites because of the increasingly popular utilization of intermediaries in the form of electronic-commerce platforms that have wide coverage, are easy to operate, and are cheap or even free.

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